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Exploring the Relationship Between Myers-Briggs Type and Instructional Perspectives among College Faculty across Academic Units

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EXPLORING THE RELATIONSHIP BETWEEN MYERS-BRIGGS TYPE AND INSTRUCTIONAL PERSPECTIVES AMONG COLLEGE FACULTY ACROSS ACADEMIC DISCIPLINES

by

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Abstract

Education has the opportunity to play an integral role in sustaining the health of our economy in an increasingly competitive, global market. A review of the issues and trends impacting higher education reveals growing pressure placed on faculty to advance instructional outcomes among more diverse populations. Imbedded is the challenge to create new knowledge about how to improve instruction.

As diversity among college students in terms of age, gender, and ethnicity continues to increase, psychological type provides a means for examining important differences in choice of academic discipline(s), persistence, learning style, and teaching style preferences. Faculty members face increasing pressure to be critically reflective in their instructional practices. Research investigating the link between the psychological type and instructional perspectives offers insight for examining differences and promoting dialogue on ways higher education institutions can become more responsive to the needs of students of all types.

This research investigated the relationship of psychological type, as measured by the MBTI and instructional perspective, as measured by the Modified Instructional Perspectives Inventory (IPI) among faculty across academic disciplines at four campuses of a public land-grant university. This study also examined variations in instructional perspectives among faculty of similar type teaching in the same academic disciplines and whether these variations are related to exposure to adult learning theories, methods, and/or instructional strategies. Research found a significant relationship between the Myers-Briggs Type Indicator and the Modified Instructional Perspectives Inventory. Findings provide evidence that variations in instructional perspectives among faculty members of similar MBTI types teaching in same academic disciplines do exist and that exposure to adult learning theories, methods, and/or instructional strategies accounts for a significant proportion of the variation.

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Swahili Proverb:

Kupotea njia ndiko kujua njia!

“By losing the way one learns the way!”

(Vella, 2002, p.77)

Chapter 1: Introduction

Our world is moving at such a fast pace. For some, it can seem as though life itself is spinning out of control and the rate of change is increasing exponentially. Consider technology as an example; almost as soon as one begins to develop some level of comfort and skill in utilizing a new technology, that same technology has already or is soon becoming obsolete. As we enter new paradigms, even the meanings of words evolve in response to changes in our culture and society. Obsolescence is now commonly defined among electronic sources, like Wikipedia, as "the state of being which occurs when a person, object, or service is no longer wanted even though it may still be in good working order." The reality that people are now included in the definition of obsolescence underscores the need for individuals and organizations to continually assess their vision, mission, goals, and skill capacity as well as the value of engaging in lifelong learning and investing in continued personal and professional development.

To survive and thrive in a highly competitive, technologically based, global economy, individuals and organizations alike must constantly update and expand their knowledge and skills. Job descriptions, work arrangements, and work processes continue in a state of flux as organizations restructure operations, outsource tasks, implement new systems, and use new communication technologies to access an international workforce. Such changes provide real pressure on individuals to seek out opportunities to upgrade current skills and/or develop new skills that allow greater competitiveness and possible advancement in an existing career as well as the prospect of transitioning into a new field. Cooper, Henschke, and Isaac (2003) stress that "any change – marriage, the birth of children, the loss of a job, divorce, the death of a friend or relative, or a change of residence – can trigger readiness to learn" (p.1). This readiness to learn can also be induced by exposing learners to more effective role models, engaging them in career planning, and providing them with diagnostic experiences (Cooper, Henschke, & Isaac, 2003).

As the United States passes through a period of significant change with respect to its economic security, demographic profile, and competitive position on the global stage, it is especially important that higher education institutions become more responsive to the needs of students of all types (Stokes, 2006). "Although 'traditional' 18-22 year-old full-time undergraduate students residing on campus account for only 16% of higher education enrollments", Stokes (2006) contends that "the attention given to this group of students obscures the fact that the vast majority of college and university students are 'non-traditional' – largely working adults struggling to balance jobs, families, and education" (p.1).

Benshoff and Lewis (1992) agree with Cross (1980) that non-traditional students differ characteristically from younger college students, specifying that adult learners tend to be achievement oriented, highly motivated, and relatively independent with special needs for flexible schedules and instruction appropriate for their developmental level. Most proponents of adult education recognize that these non-traditional adult learners enter into the learning environment with their own specific objectives, motivations, wants and needs. Because developmental needs, issues, and stressors for adults differ considerably from those faced by younger, "traditional-age" students, Benshoff (1991) contends that all aspects of the college environment must be reconsidered (and often reconfigured) to respond to this student population.

Cooper et al. (2003) considered the establishment of a climate conducive to learning as a prerequisite for effective learning. Brookfield (1986), Conti (1985b), Darkenwald (1989), Dunn and Dunn (1979), Fenwick (1996), Fraser (1986, 1989), Galbraith (1998), Goldstein and Benassi, (2006), Grasha (1994), Gregorc (1979), Hativa & Birenbaum (2000), Heimlich and Norland (2002) Henschke (1989), and McManus (2007) all emphasize the importance of a suitable climate for learning. Consideration includes both the physical climate as well as the psychological climate (Cooper et al., 2003). Vella (2002) stresses the importance of safety,

stating "people have shown that they are not only willing but also ready and eager to learn when they feel safe in the learning environment" (p. 8). The competence of the design and the teachers, the feasibility and the relevance of the objectives, the willingness to allow learners to express their own voice, the appropriate sequencing of activities, and the realization of a nonjudgmental, accepting environment all contribute to safety (Vella, 2002).

Benshoff (1991) stresses that adults value opportunities to integrate academic learning with their life and work experiences and generally prefer more active approaches to learning as cited in Benshoff and Lewis (1992). McManus (2007) argues that the teaching style of the adult educator acts as a key influence on the learning environment and contributes to the emotional climate of the classroom, based on the work of Conti (1985a), Grasha (1994), Hativa and Birenbaum (2000), Knowles (1970), Kuchinskas (1979). Although the adult education literature (Houle, 1996; Kidd, 1976; Knowles, 1970; Lindeman, 1961; Friere, 1970) traditionally suggests that a learner-centered, collaborative mode in which the teacher functions as a facilitator to create a supportive environment in which the learner is free to take risks is generally the most effective approach to educating adults, Conti (1985a) found that GED students learned more in a teacher-centered environment. Conti (1985a) confirms that a relationship between the teaching style and student achievement does exist, while simultaneously challenging the notion that one general approach will meet the diverse needs of all adult learners in each specific situation.

McManus (2007) contends that the role an adult educator assumes, and subsequent choices of instructional technique are influenced by the purpose for instruction. Building on the research of Ash (1986) Dunn and Dunn (1989), and Teele (1994), Fouts (2000) posits that academic achievement among students improves significantly when instructional style is designed to correspond to specific characteristics, (e.g. psychological type, learning style, and/or type of intelligences), of students. Fouts (2000) reports "research regarding teacher learning

styles, instructional style, and subject preference supports the importance of matching the instructional style of the teacher and the education program environment to the characteristics of the students' learning preference as a vehicle for improving achievement and satisfaction within the academic setting" (p. 54).

This discussion suggests a common theme: there is an expressed call to educators to appreciate, acknowledge, and encourage different ways of learning and teaching, in accordance with the needs of the students. According to the Myers and Briggs Foundation (2009),

> Many of the pioneering studies for the Myers-Briggs Type Indicator (MBTI) instrument were done with high school and college students. These original studies plus the ongoing data collected by colleges and universities have resulted in a wealth of information about how personality affects learning and teaching styles. In addition significant information is available about how adults best learn based on personality preferences. When teachers and students understand the differences in their teaching styles and learning styles, communication, and therefore learning, is enhanced.

As visible diversity among college students in terms of age, gender, and ethnicity continues to increase, psychological type provides a way of examining important differences in choice of academic discipline(s), persistence, and instructional discipline as well as learning style and teaching style preferences. It may well be that preferences regarding a teacher-centered or a learner-centered environment are less a matter of age and more a matter of psychological type. Research investigating the link between the psychological type and instructional perspectives offers insight for examining differences and promoting dialogue on ways higher education institutions can become more responsive to the needs of students of all types.

Purpose of the Study

Jarvis-Selinger, Collins, and Pratt (2007) boldly state "factors that influence the process of a teacher's development are only partially understood" (p.1). The impact of psychological type on instructional perspectives warrants inquiry. This quantitative research study explores the relationship between psychological type, as measured by the Myers-Briggs Type Indicator, and instructional perspectives among faculty across academic disciplines at area colleges in a Midwestern state. This research provides an investigation into the role psychological type, as measured by the Myers-Briggs Type Indicator (MBTI), plays in predicting instructional perspective, as measured by the Modified Instructional Perspectives Inventory (IPI). This study also examines variations in instructional perspectives among faculty teaching in the same academic disciplines and whether or not these variations might be related to exposure to adult learning theories, methods, and/or instructional strategies.

Research Questions/Hypotheses

The primary research question was "What is the relationship between Myers-Briggs Type Indicator and the Modified Instructional Perspectives Inventory? Hypotheses:

H_1 = A significant relationship between the MBTI and Modified IPI exists.

H_0 = There is no significant relationship between the MBTI and the Modified IPI.

Subsequent research questions:

1. What are the reported MBTI types among college faculty across academic disciplines? a. What differences emerge in the reported MBTI types among college faculty teaching in different academic disciplines? b. What differences emerge in the reported MBTI types among college faculty teaching within the same academic discipline?

2. What are the instructional perspectives of college faculty across academic disciplines? a. What differences emerge in the instructional perspectives among college faculty teaching in different academic disciplines? b. What differences emerge in the instructional perspectives among college faculty teaching within the same academic discipline?
3. What are the differences in training and preparation (major, graduate concentration, degree, level and sources of exposure to instructional strategies) among college faculty teaching within the same academic discipline?
4. Are there variations in instructional perspectives among faculty members of similar MBTI types, teaching in the same academic disciplines, related to exposure to adult learning theories, methods, and/or instructional strategies?

Delimitations/Scope of the Study

The scope of this study is limited to an investigation into the relationship between instructional perspectives and psychological (MBTI) types. It does not explore the relationship between instructional perspective and learning styles, learning outcomes, or multiple intelligences. While this study incorporates the use of the Myers-Briggs Type Indicator and the Modified Instructional Perspectives Inventory, emphasis will be placed on the role psychological type plays in predicting instructional perspective rather than validation of the two instruments. A significant amount of research has been conducted using the MBTI, demonstrating both construct validity and reliability. Content validity was established on the IPI during development (Henschke, 1989) and construct validity was affirmed through research by Stanton in 2005. Reliability for each factor of the IPI was determined by Thomas (1995) and Stanton (2005) using Cronbach's alpha reliability coefficient (McManus, 2007).

The sample population is limited to faculty teaching across academic disciplines at four public land-grant universities in the same Midwestern state. The academic units were condensed into nine broad categories: Business & Industry, Communication & Fine Arts, Education, Engineering, Humanities, Mathematics & Computer Science, Medical Sciences, Natural Sciences, and Social Sciences.

Definition of Terms

Action Learning	Action learning is defined as a continuous process of learning and reflection, usually with an intention of "getting things done" (McGill & Beaty, 1992, p.11), and a means of developing intellectual, emotional, or physical methods to handle real and complex issues (Marquardt, 1999).
Adulthood	Adulthood no longer begins when adolescence ends. In the bridge to adulthood, also referred to as early adulthood, many more young people are caught between the demands of employment (e.g., the need to learn advanced job skills) and economic dependence on their family to support them during this transition (Furstenberg, 2003). While most young adults are physically mature and possess the intellectual, social, and physiological skills needed for adulthood, many lack the economic independence to become a self-sufficient adult (Furstenberg, 2003).
Adult Educator	One who has some responsibility for helping adults to learn by helping the learner diagnose learning needs, planning with the learners a sequence of learning experiences, creating

	conditions which will cause the learners to want to learn, selecting effective methods and techniques for learning, providing resources necessary to produce learning, and helping learners measure the outcomes of learning experiences (Knowles, 1980; Dawson, 1997).
Adult Learner	Adult learners fall within a broader category of learners referred to as non-traditional students. Typically considered age 25 and older, these students must balance school with employment, family, and financial responsibilities, making successful completion of their educational objectives more difficult. Synonyms: non-traditional student, returning student, adult student, and/or re-entry student.
Andragogy	Andragogy is the art and science of helping adults learn (Knowles, 1996; Henschke, 1998; Merriam, 2001).
Behaviors	"Behaviors are the activities designed to occur during the teaching-learning process to support the learners in reaching their goals" (Dawson, 1997, p. 5; Stanton, 2005, p. 20).
Beliefs	Beliefs are what one accepts as truths (Apps, 1996). Beliefs may include learned values and behaviors held by the educator toward the learner that impact the educational process (Thomas, 1995; Dawson, 1997; Stanton, 2005). "Beliefs represent the most stable and least flexible aspect of a person's perspective on teaching" (Pratt, 1998, p. 21).

Community of Inquiry	In a community of inquiry, the approach to learning is that of cooperative inquiry, investigation, and dialogue (Sharp, 1987). Students actively and collaboratively question, criticize, and reconstruct meanings (Vega & Tayler, 2005).
Empathy	Empathy is the capacity for experiencing as one's own the feelings of another (Aker, 1976; Seward, 1997).
Feelings	"Emotional perspectives of the teacher towards the students" (Dawson, 1997, p. 5; McManus, 2007, p. 8).
Instructional Perspectives	"Guiding beliefs, feelings, and behaviors theorized and practiced by adult educators" (Stanton, 2005, p. 21; McManus, 2007, p. 8).
Instructional Practices	Instructional practices include specific teaching strategies and methods that guide interaction with and among learners. Synonym: teaching practices.
Learner-centered	Learner-centered refers to an instructional model in which students are active learners and faculty members are facilitators rather than transmitters of knowledge (Vega & Tayler, 2005).
Learning	Learning is the lifelong process of transforming information and experience into knowledge, skills, and attitudes.
MBTI Types	The MBTI instrument contains four separate indices: extraversion-introversion, sensing-intuition, thinking-feeling, and judgment-perception. A pattern of responses indicate a preference for one pole over the other on each of the four

	indices. The preferences on each index are independent of preferences for the other three indices, so that the four indices yield 16 possible combinations called "types," denoted by the four letters of the preferences (e.g., ESTJ, INFP). Synonyms: psychological type and personality type.
Nontraditional Student	Research on nontraditional students usually considers students who are age 25 or older (Benshoff & Lewis, 1992; Cross, 1980; Metzner & Bean, 1987; Nora, Kraemer & Itzen, 1997); however, the definition of this term will be expanded beyond the scope of adult learners to include home-schooled students, traditional-age students who are also parents and/or full-time employees, students who are financially independent, as well as military personnel.
Pedagogy	Pedagogy is "the art and science of helping children learn." (Knowles, 1980, p. 43; Merriam, 2001, p. 5).
Personality Theory	Personality theory focuses on individual differences in human behavior. The essence of Jung's theory is that much seemingly random variation in behavior is actually quite orderly and consistent, being due to basic differences in the way individuals prefer to use their perception and judgment (Kiersey, 1984; Myers & McCaulley, 1985).
Preferences	In a manner similar to left-or-right handedness, the principle of preferences is that individuals find certain ways of thinking and acting easier than others (Kiersey, 1984).

Psychological Type	Psychological type represents one of 16 MBTI types. Synonyms: personality type and MBTI type.
Temperament	Temperament theory focuses on the underlying drives for meaning that gives individual personalities direction and purpose and postulates that humans have a natural selection process that places them in one of four core temperament types. Keirsey noticed four two letter codes in the MBTI corresponded with the four temperament types. He further noted that four of the MBTI personality types corresponded with each of the four temperaments (Kiersey, 1984).

Significance of the Study

In response to U.S. Department of Labor data which indicate that 90 percent of the fastest growing jobs require some form of postsecondary education, Stokes (2006) emphasizes higher education has the opportunity to play an integral role in sustaining the health of our economy. Stokes (2006) postulates that in order for higher education institutions to effectively mobilize and meet the real education needs of an increasingly competitive, global market economy, it is first necessary to recognize the diverse faces of higher education. While this includes, it is not limited to, recognizing the extent to which adult learners impact the future of higher education. Stokes (2006) is optimistic that this realization will serve as a catalyst for advancing instructional outcomes among increasingly diverse populations so that they can prosper and enrich their lives in ways that ultimately serve the economic, cultural, and competitive interests of all.

Imbedded in this concern is the challenge to create new knowledge about how to improve instruction. Over the past several years, there has been a resurgence of interest in teaching in adult and higher education. This is evidenced by the increase in the number of papers on

teaching in the adult education literature as well as an increase in the emergence of centers for faculty development and teaching in higher education; however, research into faculty development is limited (Collins, Jarvis-Selinger, & Pratt, 2001). This study will aid in the expansion of this body of knowledge.

Jarvis-Selinger, Collins, and Pratt (2007) assert that studying within a discipline, especially to a level commensurate with an undergraduate or graduate degree, is a form of enculturation into ways of thinking, forms of knowledge, and normative roles for both teachers and learners. Vega and Tayler (2005) claim that "because most professors are not experts in pedagogy, they tend to emulate the traditional transmission model in which they themselves were trained, where the instructor is the center of attention" (p. 83). Vega and Tayler (2005) go on to say that "this dilemma is particularly acute in the content-laden college classroom" (p. 83). As external organizations and agencies continue to evaluate the effectiveness of higher education, adult educators will likely face greater and greater pressure to be critically reflective in their instructional practices. The results of this study will provide additional guidance into the process of critical reflection.

Extensive research has been done on the Myers-Briggs Type Indicator. The MBTI has received widespread use by consultants and researchers in the field of professional development (Walck, 1997). The Myers-Briggs has been compared to numerous instruments, such as the BarOn EQ-i on emotional intelligence, Felder and Silverman's Index of Learning Styles, the Kolb Learning Styles Inventory, the Kirton-Innovation Inventory, the Leadership Style Indicator, etc.; however, no comparison on instructional/teaching perspectives can be located in this body of research. In addition to contributing to this extensive body of research, this study will provide faculty with the opportunity to gain greater insight into their own instructional styles and individual preferences.

The Instructional Perspectives Inventory, first validated by Henschke in 1989 and then modified and re-validated by Stanton in 2005, provides an important measurement tool for adult educators to reflect on and benchmark instructional practices. And while this instrument offers to expand our understanding of factors influencing the process of faculty development, research on the application and use of this instrument is quite limited. To date, no research has been conducted on the relationship between the MBTI and the Instructional Perspectives Inventory. This research study will provide additional insight into the application of this tool for faculty development.

Summary

To survive and thrive in a highly competitive, technologically based, global economy, individuals and organizations alike must constantly update and expand their knowledge and skills. Those serving in higher education have the opportunity to shape future generations. As visible diversity among college students in terms of age, gender, and ethnicity continues to increase, psychological type provides a way of examining important differences in choice of academic discipline(s), persistence, and instructional discipline as well as learning style and teaching style preferences. It may well be that preferences regarding a teacher-centered or learner-centered environment is less a matter of age and more a matter of psychological type. As faculty members face greater and greater pressure to be critically reflective in their instructional practices, research investigating the link between the psychological type and instructional perspectives offers insight for examining differences and promoting dialogue on ways higher education institutions can become more responsive to the needs of students of all types.

Chapter 2: Literature Review

Our world is changing at an exponential rate. In many circles around the globe, higher education is seen as both an economic driver as well as an economic asset. Institutions of higher learning play a vital role in helping to develop the human capacity to solve complex problems in our world. The influence and impact of faculty is significant. Bok (2006) summarizes:

> During the 1980s, as major U.S. companies felt the hot breath of foreign competition and Japanese goods invaded our stores and showrooms, Americans began to ask what had gone wrong with the economy. Government officials, journalists, and analysts of every kind looked for anyone or anything that might be responsible for our seeming competitive weakness. Business executives were the first to bear the brunt of public scrutiny. Education's turn came soon after. In 1983, a national commission on the public schools wrote a widely publicized report, A Nation at Risk, which referred to "a rising tide of mediocrity" and warned of "unilateral educational disarmament." A flood of commentaries followed urging all manner of reforms. As public schools came under heavy assault, old university hands predicted that higher education would eventually suffer the same fate. They were soon proved right. Within a few years, Secretary of Education William Bennett and Lynne Cheney, head of the National Endowment for the Humanities, issued sharp critiques of the undergraduate curriculum along with concrete proposals for reform. Public intellectuals, such as Dinesh D'Souza, and journalists, such as Charles Sykes, quickly weighed in with harsh attacks on a broad array of university policies. Professors – almost all from the humanities – began publishing critical essays of their own (p. 1-2).

While most of the problems have been recognized and many have been investigated in detail by specialists in educational research, Bok (2006) reveals that such findings often appear piecemeal

in specialized professional journals with limited distribution and little discussion on policy implications. Research investigating the link between the psychological type and instructional perspectives offers insight for examining differences and promoting dialogue on ways higher education institutions can become more responsive to the needs of students of all types. This chapter will review relevant literature concerning the issues and trends impacting higher education, faculty development, teaching and learning, andragogy, instructional perspectives, and psychological types.

Issues and Trends Impacting Higher Education

As the United States passes through a period of significant change with respect to its economic security, demographic profile, and competitive position on the global stage, it is especially important that higher education institutions become more responsive to the needs of students of all types (Stokes, 2006). Warning schools and colleges to consider changing the way they prepare upcoming generations while simultaneously urging society to rethink education and learning and contemplate the merits of lifelong learning, Cross (1981) foreshadowed what was to come as she emphasized changes so great and so far reaching that no amount of education during youth could prepare adults to meet the demands that will be made on them. As early as 1981, Cross is quoted as saying, "It would be difficult to think of some way to live in a society changing as rapidly as ours without constantly learning new things" (p. 1).

Increased Skepticism Regarding the Quality of Public Education. Gummon (2008) points out that there is indeed increasing public skepticism about the quality of the U.S. K-12 public education system and its ability to adequately prepare students for either employers or postsecondary institutions. Stuart (2009) reports "people with a high school education or less are finding it close to impossible to find work that produces enough income to support themselves and their families" (p.14). As technology increases, nearly every kind of work requires higher

levels of proficiency. Unfortunately, many students graduating high school are not adequately prepared for collegiate work. Of the 2008 freshman class entering the California State University system, 47 percent of the students needed remedial English and 37.2 percent needed remedial math, including those who fell in the top 33 percent of their graduating class (Stuart, 2009). Remediation is a valid concern. In the past, these students were weeded out of the system; today many colleges and universities are recognizing the need for remediation and taking creative approaches to help shore up this achievement gap.

Rapid Rise of Home Schooling. Gaither (2009) reports "From 1999 to 2003 the number of home-schooled children increased from around 850,000 to roughly 1.1 million, a 29 percent jump in four years" (p. 12) with "the Black homeschool movement growing at a faster rate than the general homeschool population" (p. 13). Across the board, home schooling rates across diverse ethnic and religious groups are much higher than expected (Gaither, 2009). Simultaneously, an increasing number of wealthy Americans are hiring private tutors for their children. The use of technology has enabled home school families to develop and maintain supportive connections while seeking advice concerning pedagogical or curricular decisions and accessing online curricula and other innovative educational tools. From Gaither's (2009) perspective, "Home schooling is blending with other education movements to lead the way toward a 21st-century education matrix that is far more dynamic and adaptive than the schooling patterns of the past" (p. 12). Institutions of higher learning continue to face a dramatic rise in applicants without a traditional high school background. In many cases, these traditional age students offer vastly different perspectives than their peers and hold fast to a new set of expectations on teaching and learning.

Generation NeXt. Taylor (2005) provides an examination of the current cohort of traditionally-aged college students, known as Generation NeXt. The product of a very different

social reality and historically unique formative experiences, a large number adjusted to a variety of care takers, fended for themselves as latchkey kids, and spent countless hours in front of televisions, game machines, and computers, resulting in a belief that education is supposed to be entertaining, easy, and fun (Taylor, 2005). Taylor (2005) asserts "Many, if not most, educators grounded in the scientific method of the modern era, are increasingly at a loss to engage postmodern students" (p. 100), complaining this cohort holds lower academic standards, lacks self-direction in learning, and is accustomed to grade inflation and accumulating trophies just for being on the team. Placing a premium on consumerism and freedom in personal choice, Taylor (2005) warns that many "seek instant gratification, look for the best deal, want to negotiate, and might, if disappointed, become litigious" (p. 100). Many view educators as service providers rather than experts or scholars and hold the perception that payment of tuition rather than the extension of effort provide just cause for receiving the acceptable grades (Taylor, 2005).

For those who had to fight for their right to have basic needs met, they may appear to have an inflated view of self, seem very skeptical of information presented, and come across as cynical in their lack of trust in authority and social institutions, including the government, the media, organized religion, business/economy as well as institutions of higher learning (Taylor, 2005). While Taylor (2005) outlines some trends among Generation NeXt, he makes it clear that they are very diverse and more open to diversity than their predecessors. Including normal academic pressures, Generation NeXt faces a myriad of stressors including work, finances, debt, splintered relationships and concern for their safety and well-being.

Growth in the Need for Counseling. The mental health of students attending college is becoming an increasing cause for concern as counselors confront an increase in reports of depression, anxiety, and major psychological disorders (Grummon, 2008). With 8.5 percent of enrolled students seeking counseling in 2007, Grummon (2008) draws attention to the

disproportionate ratio of counselors to students as 1 to 1,929, voicing concern that over 90 percent of campus counseling directors report that the recent trend toward greater numbers of students with severe psychological problems continues to be true on their campuses. With the passage of the new GI bill, institutions can expect more veterans from Iraq and Afghanistan to return to college. Veterans encountering post-traumatic stress disorder and physical disabilities acquired as a result of combat will require support as they transition into new roles.

Traditional versus Nontraditional Students. The line between traditional and nontraditional students has blurred. In the span of a few generations, significant cultural, economic, and demographic changes have altered the path that many young adults follow as they strive for the traditional milestones of adulthood. Research on nontraditional students usually considers students who are age 25 or older (Benshoff & Lewis, 1992; Cross, 1980; Metzner & Bean, 1987; Nora, Kraemer & Itzen, 1997). Often referred to as ‘adult students,’ "re-entry students," "returning students," and "adult learners," Benshoff and Lewis (1992) describe the nontraditional student as an adult who returns to school full- or part-time while maintaining responsibilities such as employment, family, and other responsibilities of adult life. Without even attempting to offer a composite profile of an adult learner, Long (1990) contends that some important distinctions between adult learners and younger learners can be made. Younger individuals are more likely to share more common critical variables and conversely adults are more physiologically, psychologically and sociologically diverse than children (Long, 1990). Characteristics of nontraditional students now expands beyond the scope of adult learners to include home schooled students, traditional age students who are also parents and/or full-time employees, students who are financially independent, as well as military personnel, etc. The key point is that there is a wide range of differences among learners and the challenge is to be sensitive to the idiosyncrasies of each learner (Long, 1990).

Push for Intercultural Learning Experiences. The Institute of International Education reports a 60 percent increase in the number of students studying outside their native country since the year 2000 (Bowman, 2009). Recognizing international study as an essential part of preparing for a successful career in a global environment, American students continue to study abroad in record numbers. According to the Institute of International Education (2009), the number of international students at colleges and universities in the United States increased by 8 percent in the 2008/09 academic year, the largest percentage increase in international student enrollments since 1980/81, marking the third consecutive year of significant growth. International students coming to the U.S. mainly study business management, engineering, science and math - in that order, contributing more than $17 billion to the U.S. economy (Bowman, 2009). The Institute of International Education's Fall 2009 online survey indicates a mixed picture, with international enrollments varying according to different countries of origin and types and sizes of host institutions: 50% of responding campuses are continuing to see increases in international student enrollments (down from 57% who saw increases the previous year), while 24% reported declines, and 26% reported levels about the same as for the prior year. Driven largely by increases in undergraduate students from China, the largest growth was seen in undergraduate enrollments, which increased by 11%, compared to a 2% increase in graduate enrollments (Institute of International Education, 2009). The 2009 findings (Institute of International Education) do not reflect the full impact of the past year's economic downturn, since decisions to come to the United States to study were made before the financial effects were fully felt in the sending countries.

Erosion in the United States' Share of Higher Education Market. While higher education may be seen as an economic driver as well as an asset to the world, Grummon (2008) warns that the United States is beginning to experience erosion in its position as the most trusted

supplier. Bok (2006) reports "Europe and Asia are beginning to pay more attention to their universities, recognizing that first-rate research and advanced education are essential ingredients of success in today's global economy" (p. 5). Baker (2007) hopes it will serve as a wake up call to universities and governments around the world to learn China is now the largest higher education system in the world, awarding more university degrees than the United States and India combined. Through a conscious policy of investment in higher education, China, with the exception of the U.S., now awards more doctoral degrees than every other country around the globe (Baker, 2007). Canada is also increasing its investments in higher education as well as its ability to attract high quality students from the United States and abroad. Bok (2006) challenges educators to seize this opportunity to reappraise efforts.

Rising Economic Pressures. With regard to the economic downturns and eroding market shares, there is disagreement as to whether the United States is experiencing the normal waves of growth and contraction typical of capitalistic economies or is headed toward a protracted period of economic depression (Galambos, 2009). Galambos (2009) reports "Some economists believe that this next economic depression will be worse than the Great Depression of the 1920s and 1930s" (p. 2), predicting what they term 'The Greater Depression'. Grummon (2008) confirms that global economic indicators indeed forecast more hard times for U. S. citizens over the next couple of years. As unemployment continues to rise, public funding is not keeping pace with the rising cost of transportation, tuition, fees, books, housing, meals, forcing many students to seek financial aid, consider part-time enrollment, or forgo their education at this time (Grummon, 2008). Grummon (2008) reports that minority students and first-generation students are hit hardest when trying to navigate the financial aid system. Today, low and middle-income students face greater pressure to either work while enrolled in college or increase borrowing to finance their education (Lee & Cleary, 2004).

Challenges in the Professorial Job Market. Part-time employment certainly isn't limited to full-time students. Lee and Cleary (2004) noted a shift toward hiring part-time/adjunct, full-time non-tenure-track faculty and graduate employees rather than relying on full-time tenured professors. Grummon (2008) warns "First-year college students are significantly less likely to return for sophomore year if 'gatekeeper' courses (ones with 90 or more enrollees) are taught by part-time instructors" (p. 6), noting the effect was even stronger in community colleges. Galambos (2009) is concerned that adjunct and non-tenure-track faculty may be at greater risk of losing their employment should the economy continue its decline.

Colleges have already begun to counter economic concerns by declaring hiring freezes, eliminating positions, requiring mandatory furloughs, cutting executive salaries, eliminating faculty and staff raises, and delaying capital and renovation projects (Galambos, 2009). If the economy continues to spiral downward, Galambos (2009) forewarns faculty may be forced to make individual sacrifices for the greater good. Reminding faculty to be sensitive to the sacrifices students are making to be in school as well as the growing need for support and guidance as students face increasing hardships, Galambos (2009) suggests that the time is right for reviewing curricula and their relevancy to the fluctuating job market. If education is to play a role in keeping the U.S. workforce competitive, then bridging the socioeconomic achievement gap must become a priority. The U.S. Department of Labor data indicates that 90 percent of the fastest growing jobs require some form of postsecondary education (Stokes, 2006).

Summary of Issues and Trends Impacting Higher Education. Stokes (2006) postulates that in order for higher education institutions to effectively mobilize and meet the real education needs of an increasingly competitive, global market economy, it is first necessary to recognize the diverse faces of higher education. Stokes (2006) is optimistic that this realization will serve as a catalyst for advancing instructional outcomes among increasingly diverse

populations so that they can prosper and enrich their lives in ways that ultimately serve the economic, cultural, and competitive interests of all. Pointing out a number of opportunities in light of changes in economic security, demographic profiles, and competitive position, Galambos (2009) too seems hopeful that the market may create prospects for the development of creative and innovative interdisciplinary and interuniversity partnerships while fostering enhanced community programs and relationships as we work together to find viable solutions to challenges impacting higher education. These trends provide valuable insight into students and faculty as well as the very real pressures each face as they enter the learning environment. By consciously making an effort to understand self and others more fully, communication can be enhanced. Such critical reflection is required to overcome such challenges and secure the future of higher education in America. Silverman and Casazza (2000) contend "Individuals bring many different qualities to the learning environment, and the more teachers understand diverse backgrounds, experiences and needs, the more likely they are to teach effectively" (p. 18).

Faculty Development

The pulse of American colleges and universities resonates from the heart – the faculty. Gappa, Austin, and Trice (2007) contend that the effectiveness of a college or university in facilitating students' learning, creating new knowledge, and linking research and practice in ways that benefit society is related to the quality of the faculty. Contextual changes have transformed the playing field, necessitating the development of new skills and abilities in addition to the traditional talents and competencies expected of college professors (Gappa, Austin, & Trice, 2007). Issues related to faculty development range from research and scholarship within a discipline and teaching across a variety of venues to the informed management of one's own professorial career over time (Menges & Mathis, 1988).

Factors Influencing Faculty Development. Jarvis-Selinger, Collins, and Pratt (2007) assert that "Factors that influence the process of a teacher's development are only partially understood" (p. 1). Although the authors made no attempt to correlate specific disciplines with specific orientations to teaching, they maintain that studying within a discipline, especially to a level commensurate with an undergraduate or graduate degree, is a form of enculturation into ways of thinking, forms of knowledge, and normative roles for both teachers and learners. Vega and Tayler (2005) purport that "because most professors are not experts in pedagogy, they tend to emulate the traditional transmission model in which they themselves were trained, where the instructor is the center of attention" (p. 83). Vega and Tayler (2005) go on to say that "this dilemma is particularly acute in the content-laden college classroom" (p. 83).

Based on a review of literature on teaching, learning and faculty development coupled with their own research findings, Jarvis-Selinger et al. (2007) report:

> Yet we know from other research that the types of knowledge to be taught (and learned) do influence the approach a teacher takes. For example, using two of Habermas' (1971) forms of knowledge (instrumental and communicative), Cross (1991) and Cranton (2002) found that the sciences were more concerned with transmitting instrumental knowledge, while disciplines that study human interactions were more often concerned with facilitation of communicative knowledge. This bespeaks differences not only in forms of knowledge, but in forms of teaching. Moreover, Lattuca and Starak (1995) and Braxton (1995) found that disciplines such as biology, physics, and chemistry tended to be less receptive to concerns for the improvement of teaching (such as changing from transmission to facilitation) than did the humanities and social sciences. Menges and Austin (2001) noted disciplinary differences in the character of thinking that were fostered among students across disciplines. And in a 1991-1992 survey, the Carnegie

> Foundation for the Advancement of Teaching found that faculty members held stronger affinity and loyalty to their discipline than to their department or their institution. Presumably the common commitment was established during training in their respective disciplines and continued into their professional lives. Finally, Knight and Trowler (2000) found that faculty members tended to take on the normative values, beliefs, and practices of teaching within their discipline. They found, for example, that faculty members believed that the teaching practices of their own discipline were not only appropriate to that discipline but were generally preferable to forms of teaching found in other disciplines. It seems that a culture of teaching exists within disciplines and that students are, wittingly or not, enculturated into the norms of teaching and learning that characterize their disciplines (Pratt & Nesbit 2000). (p. 67-68)

Jarvis-Selinger et al. (2007) express that it should not be surprising to find that students entering teacher training from undergraduate degrees in science might hold beliefs about teaching that differ from the beliefs of those who enter teacher training from the arts or the social sciences. Drawing attention to the fact that little or no empirical evidence to support or refute this contention exists, Jarvis-Selinger et al. (2007) build the case for conducting research into how normative beliefs might differ, if indeed they do. Menges and Mathis report a similar concern in 1988, stating "The most neglected themes in writing about faculty development concern the personal development of individual faculty members" (p. 259).

Development begins prior to, yet is influenced heavily by, the graduate school experience designed to prepare students as experts in their disciplines or their professional experience. According to Hutchings and Clarke (2004), "Graduate students learn to frame questions that are significant to their chosen fields, investigate those questions systematically, and do so in ways that contribute to the thought and practice of others" (p. 161). The same method of systematic

scholarly investigation needs to be applied to teaching and learning (Hutchings & Clarke, 2004; Seldin, 1994). Research on teaching and learning within the various disciplines would greatly expand the body of knowledge which can be used and developed over time.

Use of Adjunct Instructors. Adjunct instructors are now an integral part of many colleges and universities with trends pointing toward an increase in the use of non-tenure track professors. Noting a lack of available research on higher education's part-time workforce, Gappa and Leslie (1993) report how common the practice of hiring part-time and temporary faculty in colleges and universities had become. Resulting from their research into the practices and policies toward part-time faculty used at all levels of higher education, Gappa and Leslie (1993) organized this group of cohorts into four categories: Specialists, experts, or professionals; career-enders; freelancers; and aspiring academics. Representing over half of all adjuncts, the professionals are employed full-time outside academe and are often found teaching in private, doctoral-granting institutions as well as community colleges (Gappa & Leslie, 1993). Career-enders include adjuncts who have cut back on full-time work as a means of transitioning to a more balanced lifestyle or have already retired and want to remain active (Gappa & Leslie, 1993). Gappa and Leslie (1993) describe freelancers as adjunct faculty members who by choice combine two or more part-time jobs to satisfy their multiple needs and who leverage their association with the college or university as well as those whose primary role is caregiver to children or other family members. Gappa and Leslie (1993) point out that many aspiring academics patch together a full-time wage by maintaining concurrent employment at several institutions. While many of the policy statements in the 1980s conveyed negative connotations on the use of part-time, temporary, and adjunct faculty, Gappa and Leslie (1993) assert that it makes no sense to issue sweeping policy statements based on assumptions about part-time faculty as a homogeneous group as they possess widely differing backgrounds and the use varies

greatly among institutions. Allegations that part-time faculty have a negative impact on quality does not correspond well with the research findings of Gappa and Leslie (1993).

In keeping with Jarvis-Selinger et al. (2007), Lyons (2009) argues there is a natural human tendency to teach as taught. Lyons (2009) reports that many adjuncts rely too heavily on lecture as a means of covering the material while missing opportunities to effectively engage learners in genuine dialogue. While part-time faculty vary widely in their teaching performance, successful adjunct instructors with specialized training and extensive work experiences offer linkages to community resources that would be difficult to cultivate (Lyons, 2009).

Challenging the Status Quo. Bok (2006) finds that many important college courses are left to the least experienced teachers and that most professors continue to teach in ways that have proven to be less effective than other available methods. Although the lasting impact of college will almost certainly depend much more on how the courses are taught, Bok (2006) argues faculty typically ignore this evidence while reviewing their educational programs and instead spend most of their time discussing what courses to require. Bok (2006) further accuses faculty of stretching the principle of academic freedom beyond its original meaning in order to gain "immunity from interference with how their courses should be taught" (p. 49) as reforms in teaching methods require instructors to change long-standing habits and master new skills. Argyris and Schön (1974) assert the competence, motivation, and capabilities of both instructors and participants limit the learning environment.

Gappa, Austin, and Trice (2007) suggest that as faculty members encounter new knowledge, new students, new technology, and new expectations, they will experience greater pressure to learn continuously even as they facilitate the learning of their students. They urge universities and colleges to investigate innovative ways to integrate professional growth opportunities into faculty members' ongoing work. Gappa et al. (2007) report that results in a

recent survey of faculty developers from the United States and Canada identified the following key concerns in faculty development: Encouraging student learning, teaching underprepared students, assessing student learning outcomes, and integrating technology in teaching and learning environments.

Summary of Faculty Development. Gappa et al.(2007) contend "In order to work creatively and effectively in a rapidly changing context, faculty must engage in continuous learning so as to constantly expand their repertoires of talents and skills" (p. 20). According to these researchers, professional development provides an avenue for strengthening the quality of teaching, research, and outreach. Vibrant faculty members who are engaged in continuous learning and exploration of new ideas serve as positive models of intellectual engagement for students, staff, and their professorial peers, promoting productivity, morale, and creativity across the organization. To remain vibrant and enthusiastic, Silverman and Casazza (2000) insist that educators must engage in a continuous quest for refining and improving the teaching and learning process.

Teaching and Learning

One of the most effective measures of quality teaching is student learning. In light of all the technological advancements that have enhanced the typical college course, Bok (2006, p. 30) asks some very sobering questions:

- Has the quality of teaching improved?
- Are students learning more than they did in 1950?
- Can they write with greater style and grace?
- Do they speak foreign languages more fluently, read text with greater comprehension, or analyze problems more rigorously?

By drawing attention to the fact that faculty members, on average, spend more than half their time on matters related to teaching and less than 20 percent on research, Bok (2006) refutes a common allegation that professors are so pre-occupied with research and outside consulting that they neglect their teaching and ignore their students. Bok (2006) goes on to say that faculty who claim to care more about teaching than research greatly outnumber those who regard themselves primarily as researchers, noting that fewer than half of all professors publish as much as one article per year. Bok (2006) also reports that faculty who consult extensively usually teach as much as their less enterprising colleagues and receive better student evaluations. Contending that the issue is much more subtle, Bok (2006) asserts that there is no compelling pressure to reexamine familiar forms of instruction and experiment with new pedagogic methods in an effort to help their students accomplish more. Many collegiate performance systems reward research over teaching. While reputations are built and consensus forms on the quality of scholarly work produced by the various departments and academic units in the university, Bok (2006) acknowledges that little is known about the quality of education offered or about how much students learn.

Effective Teaching. Brookfield (1990) promotes the idea that people assimilate and gradually integrate behaviors, ideas, and values derived from others until they become so internalized that they define themselves accordingly. Brookfield (1990) boldly proclaims,

> A mass lecture to an audience of adults in which there is no opportunity for discussion, no time for questions, no chance for collaborative exploration of differing viewpoints, and no attempt to make some links between the learners' experiences and the topic under discussion is poor practice. (p. 9)

Brookfield (2006) contends that skillful teaching includes whatever helps students learn, emphasizing the need to adopt a critically reflective stance toward their practice while

maintaining a constant awareness of how students are experiencing their learning and perceiving teachers' actions. Brookfield (2006) further asserts "a teacher is perceived as being effective because she combines the element of having something important to say or demonstrate with the element of being open and honest with students" (p. 55). In addition to learning something significant, students long to be treated as adults with valuable insights and experiences to add to discussions. Brookfield (2006) believes it is a mistake to think that one can generate a prescribed set of habits of effective teachers to meet the diverse needs of students enrolled in the contemporary college classroom. Brookfield (2006) argues that bland generalizations about effective teaching are naïve and inaccurate in light of cultural formation, racial identity, gender, age, personality, learning style, readiness to learn, previous experience with the subject, and class location.

After reviewing thousands of critical incident questionnaires completed by students in different disciplines and geographic locations who represented considerable diversity, Brookfield (2006) acknowledged that two general clusters of preferred teacher characteristics emerged: credibility and authenticity. Brookfield (2006) reveals that credibility is based on the student's perception that the instructor has something important to offer (knowledge, skills, wisdom, and/or insight). Credible teachers possess a "breadth of knowledge, depth of insight, sophistication of understanding, and length of experience that far exceeds the student's own" (Brookfield, 2006, p. 56). Brookfield (2006) defines authenticity as the perception that the teacher is being open and honest in her attempts to help students learn. An authentic teacher is one that students trust to be honest and helpful. Trust is paramount. Vella (2002) expands this concept. Vella (2002) stresses the importance of safety by asserting that as people feel safe in the learning environment, they become willing and ready, even eager to learn. Vella (2002) links safety to respect, noting from experience that the safety of the program organizers and teachers is

as important as that of the learners. Vella's experience interacting with other cultures in native areas around the globe taught her that effective adult learning and teaching is:

- Political – As power (both in the process and content selected) is distributed, trust and commitment increases.
- Problem posing – Dialogue directed at examining potential centered on topical adult themes with adult materials evokes affective, psychomotor, and cognitive responses.
- Part of a whole – Educators make inroads as they consider the larger context of the learners' situation, ensure continuity, and provide appropriate follow-up.
- Participative – By allowing learners time to speak, listen, and be actively engaged in the learning, they are given the opportunity to construct their new skills, concepts, and attitudes to fit their context.
- Person-centered – Rather than merely sharing information, the purpose of adult learning and teaching is the development of all people involved.
- Prepared – From the initial learning needs and resources assessment to the use of the seven steps of design to the design of materials, the learning is prepared for a particular group of learners and adequate time is used to make it ready. (p. 77-78)

Emphasizing the need for authentic dialogue, Vella (2002) conveys the importance of understanding that people perceive the world from their own context as well as the value of modeling the skills of listening and reflecting back what one has heard. In a community of inquiry, the approach to learning is that of cooperative inquiry, investigation, and dialogue (Sharp, 1987). Students actively and collaboratively question, criticize, and reconstruct meanings (Vega & Tayler, 2005). Brookfield (1990) outlines the following principles of effective practice in facilitating learning:

- Participation in learning is voluntary; adults engage in learning as a result of their own volition. It may be that the circumstances prompting this learning are external to the learner (job loss, divorce, bereavement), but the decision to learn is the learner's.

Hence, excluded are those settings in which adults are coerced, bullied, or intimidated into learning.

- Effective practice is characterized by a respect among participants for each other's self-worth. Foreign to facilitation are behaviors, practices, or statements that belittle others or that involve emotional or physical abuse. This does not mean that criticism should be absent from educational encounters. It does mean, though, that an attention in increasing adults' sense of self-worth underlies all facilitation efforts.
- Facilitation is collaborative. Facilitators and learners are engaged in a cooperative enterprise in which, at different time and for different purposes, leadership and facilitation roles will be assumed by different group members. This collaboration is seen in the diagnosis of needs in the setting of objectives, in curriculum development, in methodological aspects, and in generating evaluative criteria and indexes. This collaboration is also constant, so that the group process involves a continual renegotiation of activities and priorities in which competing claims are explored, discussed, and negotiated.
- Praxis is placed in the heart of effective facilitation. Learners and facilitators are involved in a continual process of activity, reflection upon activity, collaborative analysis of activity, new activity, further reflection, and collaborative analysis, and so on. "Activity can, of course, include cognitive activity; learning does not always require participants to "do" something in the sense of performing clearly observable acts. Exploring a wholly new way of interpreting one's work, personal relationships, or political allegiances would be an example of activity in this sense. (p. 9-11)

Facilitation aims to foster in adults a spirit of critical reflection. Through educational encounters, learners come to appreciate that values, beliefs, behaviors, and ideologies are culturally transmitted and that they are provisional and relative. This awareness that the supposed givens of work conduct, relationships, and political allegiances are, in fact, culturally constructed means that adults will come to question many aspects of their professional, personal, and political lives.

Silverman and Casazza (2000) offer a framework for effective practice "called TRPP (theory, research, principles, and practice) as a guide for designing teaching and learning

situations in order to maximize student potential" (p. 57). These four components interact to help explain why one approach may be more effective than another, helping to integrate different theoretical perspectives in order to better understand what educators do, why they do it, and how it ultimately leads to learning outcomes (Silverman & Casazza, 2000). Decisions about instruction should be based on theory and principles of practice supported by research.

Individual and Organizational Learning. Emphasizing the value of integrating thought with action, Argyris and Schön (1974) introduced a theory of action capable of enhancing human activity, responsibility, self-actualization, learning, and effectiveness to reverse institutional decay while increasing learning and health in the organization. Argyris and Schön (1974) reinforce the need to develop an understanding of how one diagnoses and constructs experiences, takes action, and monitors behavior while simultaneously achieving goals is crucial to understanding and enhancing individual and organizational effectiveness.

According to Argyris and Schön (1974, 1978) learning involves the detection and correction of error and upon detection of an error, most people look for another operational strategy that will work within the same goal-structure and rule-boundaries. They define this simple feedback loop, 'single-loop learning', likening it to a thermostat where outcomes cause adjustment of behaviors. Argyris and Schön (1974) assert that this 'single-loop learning' is generally in operation when goals, beliefs, values, conceptual frameworks, and strategies are taken for granted without critical reflection. Argyris and Schön (1974) contend that higher order of learning occurs when one questions the goal-structures and rules upon detecting an error, 'colors outside the lines' to solve the problem or error. Argyris and Schön (1974) propose that this 'double loop learning' is more creative and may lead to alterations in the rules, plans, strategies, or consequences initially related to the problem at hand. Since double-loop learning involves critical reflection upon goals, beliefs, values, conceptual frameworks, and strategies,

Argyris and Schön (1974) believe that this way of learning is critical when individuals and organizations find themselves in rapidly changing and uncertain contexts. Double loop learning is a theory of personal change that is oriented towards professional education.

An important aspect of the theory is the distinction between an individual's espoused theory (what they say) and their "theory-in-use" (what they actually do); bringing these two into congruence is a primary concern of double loop learning (Argyris & Schön, 1974, 1978). There are four basic steps in the action theory learning process:

1. Discovery of espoused and theory-in-use,
2. Invention of new meanings,
3. Production of new actions, and
4. Generalization of results.

Double loop learning involves applying each of these steps, questioning assumptions underlying current views, and publicly testing hypotheses about behavior (Argyris & Schön, 1974, 1978, 1993). The end result of double loop learning should be increased capacity in decision making and better acceptance of failures and mistakes. Application among professors and students as well as administrators and staff across the collegiate environment offers hope of enhancing individual and organizational effectiveness in confronting the challenges of excelling in a global market economy.

Action learning, based on the relationship between reflection and action, is a continuous process of learning and reflection, usually with an intention of "getting things done" (McGill & Beaty, 1992). Action learning offers a means of developing intellectual, emotional, or physical techniques to handle real and complex issues (Marquardt, 1999). It also focuses on achieving changes in the issues as well as changes in the behavior of the individuals through these practices (Marquardt, 1999). Action learning is envisioned to help students to transfer what they have

learned in the process of solving problems today to solve other more complex workplace problems in the future. The ability to reflect on past experiences and take meaningful action enables one to overcome obstacles and thrive in an increasingly complex environment.

Challenging Existing Paradigms. Brookfield (1992) confronts the myth that learning should always be a pleasant experience as he makes clear that most significant adult learning involves joyful and painful elements. Brookfield (1992) writes "While the long-run outcome of many learning episodes can be interpreted (with benefit of hindsight) as being positive, productive, and fulfilling, while people are immersed in them they are often experienced as deeply painful, noting that significant learning generally involves fluctuating episodes of anxiety producing self-scrutiny and energy-inducing leaps forward in ability and understanding" (p. 12).

Brookfield (1992) also challenges the notion that all adults are innately self-directed learners, pointing out that readiness for self-directed learning varies greatly. People do not necessarily reach the age of adulthood, shed their teacher dependence, and exhibit a tendency, willingness, and readiness to plan, conduct, and evaluate their own learning in a self-directed manner (Brookfield, 1992). Factors that contribute to readiness include familiarity with the content area, the nature and complexity of the educational task to be undertaken, the personality of the learner, the subculture from which he or she comes, and the political ethos of the time and culture (Brookfield, 1992).

The adult education literature (Houle, 1972; Kidd, 1976; Knowles, 1970; Lindeman, 1926, 1961, p. 119; Friere, 1970) traditionally suggests that a learner-centered, collaborative mode in which the teacher functions as a facilitator to create a supportive environment in which the learner is free to take risks is generally the most effective approach to educating adults; Conti (1985a, p. 227) found that GED students learned more in a teacher-centered environment.

Summary of Teaching and Learning. While addressing the diverse learning needs of students adds to the challenges instructors face, accounting for differences has the potential to help students succeed in higher education as instructors improve course design, introduce variety into teaching methods and learning activities, and promote a more positive environment that places students at the heart of learning. Bain (2004) asserts "The best college and university teachers create what we might call a natural critical learning environment in which they embed the skills and information they wish to teach in assignments (questions and tasks) students will find fascinating – authentic tasks that will arouse curiosity, challenging students to rethink their assumptions and examine their mental models of reality" (p. 47). Instructors should work to create a safe environment in which students can engage, experiment, come up short, get some constructive feedback and try again (Vella, 2002; Bain, 2004).

The Role of Andragogy

Andragogy is traditionally defined as the art and science of facilitating adult learning. Houle (1996) purports "Andragogy remains as the most learner-centered of all patterns of adult educational programming" (p. 30). To Houle (1996), andragogy became the rallying cry to alert educators to the need to "involve learners in as many aspects of their education as possible and in the creation of a climate in which they can most fruitfully learn" (p. 30).

Historical Roots of Andragogy. Sources in the adult education literature seem to agree that the term 'andragogy' first originated in 1833 through the writings of a German teacher, Alexander Kapp, describing aspects of Plato's theory on education (Henscke & Cooper, 2007; Henschke, 2009; Smith, 2009). The term fell into disuse and was resurrected in a 1921 report by Rosenstock in which he argued that 'adult education required special teachers, methods and philosophy, using the term andragogy to refer collectively to these special requirements' (Smith, 2009a). Henschke (2009) contends that "historical thinking is a fundamental dimension of

andragogy, in that past events are to be analyzed for what can be learned from them so that past failures might not be repeated" (p. 55). In the first 100 years the term andragogy existed, it was only published a few times, however, the term would ignite a firestorm that begins in 1968 (Henschke, 2009; Merriam, 2001).

Impact of Andragogy on Adult Education and Human Resource Development. Smith (2009a) shares andragogy and the name of Malcolm Knowles have become inextricably linked in the minds of many around the adult education field. Henschke and Cooper (2007) agree that Knowles popularized the term andragogy in the 1970's and 1980's, they contend that "its original introduction into the USA was in 1926 by E. C. Lindeman, and again in 1927 by Lindeman and M. L. Anderson" (p. 2). And while Knowles regarded Lindeman as his mentor, Knowles (1970) indicated that he acquired the term from Dusan Savecevic in 1967 (Henschke, 2009, Smith, 2009b). Merriam (2001) reflects,

> In 1968, Malcolm Knowles proposed "a new label and a new technology" of adult learning to distinguish it from preadult schooling (p. 351). The European concept of andragogy, which he defined as "the art and science of helping adults learn," was contrasted with pedagogy, the art and science of helping children learn (Knowles, 1980, p. 43). Andragogy became a rallying point for those trying to define the field of adult education as separate from other areas of education. (p. 4-5)

Originally convinced that adults learned differently from children, Knowles (1970) set andragogy against pedagogy, thus providing the basis for a distinctive field of enquiry (Henschke, 2009; Smith, 2009c). Swanson and Holton III (2001) offer a similar perspective, the term, andragogy, coupled with the idea that adults learn differently than children "sparked much subsequent research and controversy" (p. 158). Sensing the importance of testing and relating andragogy within the corporate sector, Knowles (1973) focused a full application of his

conception of andragogy toward the Human Resource Development (HRD) Movement (Henschke, 2009).

Merriam and Caffarella (1991) contend that in its first introduction Knowles' offered andragogy as an attempt to build a comprehensive theory (or model) of adult learning that is anchored in the characteristics of adult learners. Knowles advanced five assumptions about the adult learner (Cooper et al., 2003; Merriam, 2001; Smith, 2009a):

- Self-Concept: The adult learner has an independent self-concept and who can direct his or her own learning.
- Experience: The adult learner has accumulated a reservoir of life experiences that is a rich resource for learning.
- Readiness to Learn: The adult learner has learning needs closely related to changing social roles.
- Orientation to Learning: The adult learner is problem-centered and interested in immediate application of knowledge.
- Motivation to Learn: The adult learner is motivated to learn by internal rather than external factors.

Swanson and Holton III (2001) credit Knowles (1998) with having provided the HRD field with the following six core assumptions or principles of andragogy:

- Adults need to know why they need to learn something before learning it.
- The self-concept of adults is heavily dependent on a move toward self-direction.
- Poor experiences of the learner provide rich resource for learning.
- Adults typically become ready to learn when they experience a need to cope with a life situation or perform a task.
- Adults' orientation to learning is life centered, and they see education as a process of developing increased competency levels to achieve their full potential.
- The motivation for adult learners is internal rather than external. (p. 159)

Andragogy versus Pedagogy. Knowles' assumptions sparked debate by researchers in the adult education community as well as researchers and teachers focused on childhood interventions. Merriam (2001) asserts that some adults are highly dependent on a teacher for structure, while some children are independent, self-directed learners. She further contends that adults may be externally motivated to learn as in attending training sessions to keep their job, while children may be motivated by curiosity or the internal pleasure of learning (Merriam, 2001). As early as (1981) Cross contends "The andragogical assumption that calls for treating adults as though they are self-directing while children are not – or at least treating adults as though they are more self-directing than children – flies in the face of the experience of many teachers who have worked with dependent adults and independent children" (p. 238).

Further challenging Knowles original assumptions, (Hanson, 1996; Merriam, 2001) argue that children in certain situations may have a range of experiences qualitatively richer than some adults. As Knowles continued to fuel discussions for research, teaching, and practice, Knowles, himself, began to question the assertion that the way in which children and adults learn is significantly different. Henschke (2009) reports that first time Knowles labeled pedagogical as 'teacher-directed' learning and andragogy as 'self-directed' learning occurred in a 1975 guidebook for learners and teachers on the topic of Self-Directed Learning. In the years preceding pedagogy was directed toward children and andragogy toward adults. Henschke (2009) clarifies that pedagogy (teacher-centered approach) was appropriate for both children and adults in situations where new, unfamiliar content was introduced and adragogy (learner-centered approach) is more appropriate when adults or children had some background in the content.

Merriam (2001) reports that Knowles' shift from an andragogy versus pedagogy position to a continuum ranging from teacher-directed to student-directed learning occurred somewhere between 1970 and 1980. Knowles acknowledged that both approaches are appropriate with

children and adults, depending on the situation (Merriam, 2001; Henschke, 2009). Merriam (2001) viewed Knowles' admission as being similar to the view held by his mentor, Cyril Houle. Houle, and eventually Knowles, took the stance that andragogy is defined more by the learning situation than by the learner. Houle (1996) asserted "education is fundamentally the same wherever and whenever it occurs" (p. 29-30). Houle (1996) insisted that andragogy, the most learner-centered of all patterns of adult educational programming, alerted educators to the fact that they "should involve learners in as many aspects of their education as possible and in the creation of a climate in which they can most fruitfully learn" (p. 30). Jarvis (1985) argues that Knowles' definition of pedagogy as 'education from above' and andragogy as 'education of equals' is does not accurately reflect debates within the literature of curriculum and pedagogy (Smith, 2009a). Jarvis (1985) contends that 'education from above' is more content-centered whereas 'education among equals' reflects a more student-centered approach.

Cross (1981) supports Kidd's assertion that the appropriate contrast in adult education rests between teaching and learning not children and adults. Cross (1981) notes that adult education research and practice are more learner-centered. Cross (1981) further contends that Kidd's call for a science that would help us understand how learners learn instead of how teachers teach seems appropriate enough; however, an educator who wants to know how to help learners learn, must understand how teachers should behave in order to facilitate learning. The aim of facilitation is the nurturing of self-directed, empowered students. Such learners will see themselves as proactive, initiating individuals engaged in a continuous re-creation of their personal relationships, work worlds, and social circumstances rather than as reactive individuals, buffeted by uncontrollable forces of circumstance.

According to Henschke (2009), andragogy was the underlying philosophy, and self-directed learning was the way andragogy was to be implemented. Swanson and Holton III (2001)

affirm that these core principles provide a sound foundation for planning adult learning experiences, while offering an effective approach to adult learning. Swanson and Holton III (2001) claim that the second part of the andragogical model that Knowles (1995, 1984) gifted to the HRD community was the andragogical process design. Swanson and Holton III (2001) acknowledge Knowles (1984, 1990, 1995) for bestowing eight steps for creating adult learning experiences: 1. Prepare learners for the program. 2. Establish a climate conducive to learning. 3. Involve learners in mutual planning. 4. Involve participants in diagnosing their learning needs. 5. Involve learners in forming their learning objectives. 6. Involve learners in designing learning plans. 7. Help learners carry out their learning plans. 8. Involve learners in evaluating their learning outcomes.

Knowles (1975) presented the nine competencies of self-directed learning:

- An understanding of the differences in assumptions about learners and the skills required for learning under teacher-directed learning and self-directed learning, and the ability to explain these differences to others.
- A concept of myself as being a non-dependent and a self-directing person.
- The ability to relate to peers collaboratively, to see them as resources for diagnosing needs, planning my learning, and learning; and to give help to them and receive help from them.
- The ability to diagnose my own learning needs realistically, with help from teachers and peers.
- The ability to translate learning needs into learning objectives in a form that makes it possible for their accomplishment to be assessed.
- The ability to relate to teachers as facilitators, helpers, or consultants, and to take the initiative in making use of their resources.
- The ability to identify human and material resources appropriate to different kinds of learning objectives.

- The ability to select effective strategies for making use of learning resources and to perform these strategies skillfully and with initiative.
- The ability to collect and validate evidence of the accomplishment of various kinds of learning objectives. (p. 61)

Summary of the Role of Andragogy. Inherent in the definition of andragogy as the art and science of facilitating adult learning is an assumption that instructional strategies and methods are only suited to, and only to be used with, adults (Brookfield, 1992). Brookfield (1992) explains "Methodologically, it has been argued that adult education is distinguished by its concern to link educational activities to learner's experiences, by its focus on helping learners pose and solve problems, by its emphasis on experiential learning methods, and by its being learner-centered rather than dominated by an overwhelming concern for content transmission" (p.14). The argument that such methods are reserved for adult learners does not hold well with instructors who appropriately apply these concepts, principles, and approaches in their interaction with younger learners. The concern is not whether differences exist, but whether the variable of chronological age should be the chief consideration. Indeed, preferences regarding a teacher-centered or learner-center environment may well be less a matter of age and more a matter of psychological type.

Instructional Perspectives

Cooper, Henschke, and Isaac (2003) consider the establishment of a climate conducive to learning as a prerequisite to effective learning. Brookfield (1986), Conti (1985b), Darkenwald (1989), Dunn and Dunn (1979), Fenwick (1996), Fraser (1986, 1989), Galbraith (1998), Goldstein and Benassi (2006), Grasha (1994), Gregorc (1979), Hativa and Birenbaum (2000), Heimlich and Norland (2002), Henschke (1989), McManus (2007) all emphasize the importance of a suitable climate for learning. Consideration includes both the physical climate as well as the psychological climate (Cooper et al., 2003). Vella (2002) stresses the importance of safety,

stating "people have shown that they are not only willing but also ready and eager to learn when they feel safe in the learning environment" (p. 8).

Weimer (2002) writes "classroom climate results from a series of complex psychosocial relationships that exist between the faculty member and the students collectively and individually, as well as the relationships between and among students" (p. 100). Fraser's (1986) findings support the impact of psychosocial relationships on learning outcomes, noting when students are in a classroom environment they prefer, they achieve more. Knowles (1970) suggested that the teacher is the most important factor influencing the nature of learning climate.

Research demonstrates that teaching styles do affect student achievement (Conti, 1985a, 1985b). Conti (1985b) states "Elias and Merriam (1980) have suggested that the difference between those who are just practicing a profession and professionals is an awareness of the causal factors behind their basic behavior" (p. 8). Conti (1985b) draws attention to factors that influence a teacher's personal style, including educational philosophy, collaboration, experiential background and knowledge of one's own style. Conti (1985b stresses the value of instructors being able to assess their own teaching style, pointing out that a knowledge of one's own instructional style can allow the educator to better understand how various factors contribute to behavior in the classroom. Given that style is a pervasive quality that persists even though the content that is being taught may change, Conti (1985b) insists "Educators must be aware of what they do and why they do it" (p. 11).

Highly effective teachers recognize that good teaching fosters learning (Bain, 2004). Bain (2004) contends "Everything they do stems from their strong concern for and understanding of the development of their students" (p. 67). A deeper understanding of adult learning theories, instructional strategies and methodologies as well as instructional perspectives offers insight into

approaches for creating powerful learning environments and cultivating the adaptive spirit and expertise necessary to increase learning outcomes.

Development and Use of Instructional Perspectives Inventory. Building on the purposes and principles of andragogy, Henschke (1989) developed the Instructional Perspectives Inventory (IPI) as a self-reporting tool with a self-reporting key (Stanton, 2005). During developmental stages Henschke (1989) formulated the question "What ingredients are important and necessary in preparation for teaching adults or helping adults learn?" (p. 83). Reflecting on his personal and professional experience, Henschke (1989; 1994) drew five important building blocks: Beliefs and notions about adult learners, perceptions concerning qualities of effective teachers, phases and sequences of the learning process, teaching tips and learning techniques, and how the prepared educational plan is to be implemented.

The initial instrument contained a total of 50 items with ten constructed around each of the five building blocks. After completing a factor analysis which included 600 adult educators, changes to the IPI were made and a second factor analysis with 210 college instructors was then conducted (Henschke, 1989, 1994; Stanton, 2005; McManus, 2007). Henschke (1989) altered the IPI so that it included 45 items arranged on a four-point Likert scale clustered in the following seven factors:

IPI f1 Teacher empathy with learners,

IPI f2 Teacher trust of learners,

IPI f3 Planning and delivery of instruction,

IPI f4 Accommodating learner uniqueness,

IPI f5 Teacher insensitivity toward learners,

IPI f6 Learner-centered learning processes (experience-based, learning techniques), and

IPI f7 Teacher-centered learning processes.

According to Stanton (2005), Henschke promoted the Instructional Perspectives Inventory "as a quick and easy self-assessment and self-diagnostic tool to identify an educators beliefs, feelings, and behaviors at that moment in an educational experience" (p. 40). Henschke (1994) reports on four major uses:

- As a heuristic device, the IPI helps generate interaction and inventive ideas for adult education practice and theory.
- As a learning diagnostic instrument for adult teachers in preparation, the IPI enables educators to compare themselves with others and to assess as well as plan for their own professional development.
- As one learning tool to be used in conjunction with others, the IPI stimulates critical reflection.
- Such critical reflection on each of the seven factors allows the ideas to permeate the educator's feelings, beliefs and behavior. (p. 76)

Henscke (1994) utilized the instrument in a variety of settings, including graduate courses at the University of Missouri-St. Louis, graduate adult education courses and certification programs presented through the University of Missouri Extension, Kansas State University Extension, and graduate courses for Brazilian adult educators and the Federal University, Belem, Para, Brazil.

Dissertations published by Stricker (2006), Drinkard (2003), Dawson (1997), Seward (1997) and Thomas (1995) used variations of the IPI with 45 items arranged on a four-point Likert scale. Stricker (2006) conducted an investigation into principals' attitudes toward teachers in creating the conditions conducive to learning in school-based staff development. Drinkard (2003) explored the instructional perspectives of nursing educators teaching via distance education formats. Dawson (1997) conducted a study of nurse educators in an effort to identify the group mean differences across eighteen nursing programs. Seward (1997), in similar fashion as Thomas (1995), identified the instructional practices held and practiced by parent educators while working with parents as learners (McManus, 2007; Stanton, 2005).

Modifications to the Instructional Perspectives Inventory. Stanton (2005) set out to provide construct validity for the IPI and during the process of validating the instrument, she modified the IPI's scale of responses to a five-point Likert scale and changed the verbal anchors (McManus, 2007). Stanton further enhanced the modified-IPI by adding category levels regarding the use of andragogical principles. Please refer to Table 1.

Table 1

Use of Andragogical Principles Category Levels

Category Levels	Percentage	IPI Score
High above average	89-100%	225-199
Above average	88-82%	198-185
Average	81-66%	184-149
Below average	65-55%	148-124
Low below average	54%	<123

(Stanton, 2005, p. 280)

Higher scores demonstrate a learner-centered orientation, while lower scores correspond with a more teacher-centered approach.

This modified-IPI has since been used in three dissertations: McManus (2007), Reinsch (2007), Rowbotham (2007), and Ryan (2009). McManus (2007) investigated the beliefs, feelings, and behaviors of full-time mathematics faculty teaching in community colleges. Reinsch (2007) further adapted the modified-IPI into the learner's perspective as she looked into the relationship between lifelong learning, emotional intelligence, and life satisfaction for adults 55 years of age and older. Rowbotham (2007) examined the relationship between faculty teaching perspectives and students' perceptions of the learning environment. Ryan (2009) explored the relationships between instructional perspective, satisfaction with language learning, and certain teacher and student characteristics.

Myers-Briggs Type Indicator

The Myers-Briggs Type Indicator (MBTI), developed by Isabel Briggs Myers in the 1940s, offers a practical application of Carl Jung's theory of psychological types, published in 1921 and translated in 1923. The academic language of Jung's book made it hard to read and so few people could understand and use Jung's ideas for practical purposes, motivating Katherine Briggs and subsequently her daughter, Isabel Briggs Myers to find an easier way for people to apply Jung's ideas in everyday life.

Jung's Theory of Psychological Types. The essence of Jung's theory of psychological types is that much seemingly random variation in human behavior is not due to chance; it is the result of a few basic, observable differences in the way people perceive and the way they make decisions (Myers & Myers, 1989).

- Perception involves all the ways of becoming aware of people, events, ideas, or things.
- Judgment involves all the ways of coming to conclusions about what has been perceived.

Perception determines what people see in a situation while judgment determines what people decide to do about a situation (Myers & Myers, 1989). According to the Myers and Briggs Foundation (2009), "If people differ systematically in what they perceive and in how they reach conclusions, then it is only reasonable for them to differ correspondingly in their interests, reactions, values, motivations, and skills." While all people take in information and make decisions, Jung (1923) emphasized that some people prefer to do more taking in information (perceiving) while others prefer to do more decision making (judging).

Jung (1923) describes two distinct and sharply contrasting ways of perceiving: sensing and intuition (Myers & Myers, 1989).

- Sensing involves becoming aware of people, events, ideas, or things through the five primary senses of sight, sound, smell, touch, and taste.
- Intuition involves becoming aware of people, events, ideas, or things through indirect perception by way of the unconscious – a sixth sense or gut feel.

Jung's (1923) theory suggests that the two kinds of perception compete for a person's attention and that most people, from infancy up, prefer one over the other (Myers & Myers, 1989). People who prefer sensing attend to practical details as well as concrete facts and information that apply to the present reality. Sensors prefer to use skills that they have already acquired and when learning new information, they prefer to learn by doing. Conversely, people who prefer intuition attend to abstract ideas and concepts impacting the future. Intuitives enjoy reading books and materials covering a variety of subjects and multiple disciplines. They love to learn, yet they are not necessarily concerned with the application of this knowledge. When reading, sensors will often confine their attention to that which appears on the written page whereas intuitives will often read between and beyond the lines (Myers & Myers, 1989).

Jung (1923) also offers two distinct and sharply contrasting ways of judging: thinking and feeling (Myers & Myers, 1989). Myers and Myers (1989) clarify "Most people would agree that they make some decisions with thinking and some with feeling, and that the two methods do not always reach the same result from a given set of facts" (p. 3). As with perception, Jung's theory suggests that a person is almost certain to prefer one way of judging more than the other. Thinkers often take a very analytical, objective approach to decision making while feelers are more subjective, basing their decisions on the specific situation as well as individual and organizational values. Feelers are warm and friendly whereas thinkers can appear somewhat impersonal in their brief, businesslike interactions.

According to Myers and Myers (1989) "Another basic difference in people's use of perception and judgment arises from their relative interest in their outer and inner worlds" (p. 7).

Jung (1923) observed, "Each person seems to be energized more by either the external world (extraversion) or the internal world (introversion)." Jung (1967) writes,

- Introversion is normally characterized by a hesitant reflective, retiring nature that keeps itself to itself, shrinks from objects [and] is always slightly on the defensive.
- Extraversion is normally characterized by an outgoing, candid, and accommodating nature that adapts easily to a given situation, quickly forms attachments, and, setting aside any possible misgivings, will often venture forth with careless confidence into unknown situations.

Significant in Jung's theory is that preferences are inborn and not socially constructed; however, interaction with the parents, family, culture and other external influences impacts the strength and quality of the development of an individual's preferences. A supportive environment will support and facilitate inborn preference development. Conversely, a contrary environment will impede or retard the natural development of inborn preferences, leading to falsification of type (McCaulley and Moody, 2001).

Development and Use of the Myers-Briggs Type Indicator. The Myers-Briggs Type Indicator was developed by a mother, Katharine Briggs, and daughter, Isabel Briggs Myers, team over time. Briggs, a thinker, reader, and quiet observer, became intrigued with similarities and differences in human personality and began work on the development of her own typology, prior to the translation of Jung's work. When Briggs discovered Jung's theory of psychological types, she offered full acceptance of his theory and continued to expand upon his work. Having long absorbed her mother's appreciation of Jung's typology, Myers became committed to devising a method of making Jung's theory of practical use. In developing the Myers-Briggs Type Indicator, the chief aim of this mother-daughter team was to make the insights of type theory accessible to individuals and groups, addressing two related goals in the development and application of the MBTI instrument:

- The identification of basic preferences of each of the four dichotomies specified or implicit in Jung's theory.
- The identification and description of the 16 distinctive personality types that result from the interactions among the preferences.

"With no formal training in psychology or statistics, with no academic scholarships or research grants, Myers began the painstaking task of developing an item pool that would tap the attitudes, feelings, perceptions, and behaviors of the different psychological types" (p. x), persuading countless school principals to allow her to administer the inventory to their students (Myers & Myers, 1989). With the introduction of her father, Dr. Lyman Briggs, Myers won the endorsement of the Association of American Medical Colleges, allowing her to collect and analyze data on 5,355 medical students and more than 10,000 nurses from 45 medical schools (Myers & Myers, 1989; McCaulley & Moody, 2001). According to McCaulley and Moody (2001) "Myers found predicted type differences in Medical College Aptitude Test scores and later in medical specialty choices" (p. 284). Myers was then approached by Henry Chauncey with a proposal to distribute the MBTI for research purposes through the Educational Testing Service, resulting in increased exposure and enabling researchers at a number of universities to utilize the instrument in their own research (Myers & Myers, 1989). In 1975, Myers and McCaulley founded the Center for Applications of Psychological Type (CAPT) as a research laboratory providing services and assistance to researchers, educators, and practitioners in the use of this inventory and publication of the MBTI was transferred to Consulting Psychologist Press (CPP).

In the mid-1990s, CPP conducted a major revision of the MBTI, publishing an updated manual which covers MBTI applications in counseling and psychotherapy, education, career counseling, organizations, and multicultural settings. Today CPP touts "Much more than just a product, the Myers-Briggs (MBTI) assessment is a powerfully versatile solution that has helped

millions of people around the world better understand themselves and how they interact with others." Table 2 provides an overview of the MBTI's four dichotomous scales.

Table 2	*MBTI's Four Dichotomous Scales*
E-I Scale	**Extraversion – Introversion:** This scale rates a preference for focusing on the external, outer world of people or events (E) versus an inner world of ideas and reflections (I).
S-N Scale	**Sensing – iNtuition:** This scale rates preference for taking in data by being observant and using the five primary senses: sight, sound, smell, touch, taste in a step by step fashion (S) versus focusing on the big picture and making connections between facts in a theoretical manner (N).
T-F Scale	**Thinking – Feeling:** This scale rates a preference for making decisions based on logical consequences, using an objective, analytical problem solving approach (T) versus considering what is important to the people involved and making decisions on person-centered values aimed at promoting harmony and supporting others (F).
J-P Scale	**Judging – Perceiving:** This scale rates a preference for dealing with the outer world in a planned, orderly, scheduled, and systematic way (J) versus a flexible, spontaneous, open and adaptable way (P).

Scores from these four dichotomous scales indicate the strength and direction of preference: (E/I) - Extraversion or Introversion, (S/N) - Sensing or Intuition, (T/F) - Thinking or Feeling, and (J/P) Judging or Perceiving. Lawrence (1993) stresses type preferences are not traits, or even clusters of traits, instead they are preferred ways of being in the world, individual mindsets, contrasting ways of experiencing life and processing experiences in life. Results from the MBTI scales form four temperaments and 16 distinct psychological types, representing discreet patterns of motivations, interests, learning, styles, and aptitudes (Lawrence, 1993).

Application of the Myers-Briggs Type Indicator in Higher Education. In the past decades, use of the Myers-Briggs Type Indicator in higher education has been extensive, encompassing the following areas of impact: Academic advising, career counseling and vocational guidance, psychological counseling, residential decision making, enrollment management and campus retention, research approaches, student involvement and activities, student development and learning styles, faculty involvement, and effective teaching and type.

Fisher and Kent (1998) report that much attention has been given to the development and use of instruments to assess the qualities of the classroom learning environment from the prospective of both teachers and students, with perceptions of the environment garnering attention to the neglect of the person or personality. Given the voluminous literature concerning characteristics of effective teachers, Fisher and Kent (1998) express concern over the lack of research relating to teacher personality and subsequent impact on the learning environment. Tonelson (1981) reinforced the interconnectedness of teacher personality and the learning atmosphere in the classroom, suggesting a mechanism whereby teacher personality can affect student learning outcomes through the psychological environment of the classroom. Building on Tonelson's work, Fisher and Kent (1998) investigated the relationship between teacher's personality and the perceptions of teachers and students of the psychosocial environment of the classroom, finding significant associations between teacher personality type and perceptions of the classroom environment.

Fisher and Kent (1998) argue that effective teaching requires a repertoire of appropriate interpersonal and pedagogical skills, emphasizing that teacher personality cannot be given as a reason for exemption from these skills. However, awareness of teacher personality and classroom learning environment can assist teachers in developing and monitoring their skills. Henson and Chambers (2003) offer the following review of relevant literature:

> Research has found that specific personality traits of teachers are reflected in classroom instruction, especially through the teacher's use of various instructional strategies and material (Erdle, Murray & Rushton, 1985). They also found that a positive relationship existed between individual personality constructs and learning styles. Thus it is possible that certain personality types may exhibit better self-efficacy and classroom control orientation that enhance learning. Grindler and Straton (1990) found that the Myers-Briggs Type Indicator (MBTI) results could be used to help teachers develop different teaching methods and more readily accept a variety of materials and technology. Studies indicate that extroverted, stable, and tough-minded personalities tend to be more receptive to the use of new ideas (Grant & Cambre, 1990; Katz, 1992). "Intuitive/ thinking" types (or those educators who are creative, analytical, logical, and imaginative) are more receptive to using various strategies and technology than "sensory" types who are practical, realistic, and sociable (Katz, 1992; Smith, Munday, & Windham, 1993; Sudol, 1991). Also, "sensory/feeling" types of teachers are interested in examining meanings and relationships and are least likely to be comfortable with the use of newer methodologies and technology than other personality types (Grindler & Straton, 1990; Smith, Munday, & Windham, 1993).

Building on this body of research, Henson and Chambers (2003) examined personality type as a predictor of teaching efficacy and classroom control. While their findings point to a limited relationship between personality and efficacy and classroom management beliefs, Provost, Carson, and Beidler (1987) outline the following benefits to introducing type and its implications for teaching and learning:

- Facilitates personal and professional growth among faculty.

- Supports the development of natural strengths while encouraging experimentation with various teaching modes to reach diverse students.
- Increases awareness of natural biases about the best way to learn.

McCaulley and Moody (2001) report information about cultural differences is growing as the MBTI is translated all over the globe with data indicating that all 16 types appear in all cultures, but not in equal numbers. According to McCaulley and Moody (2001), Jung acknowledged the importance of culture in strong words:

> Individuation . . . is a process of differentiation, having as its goal the development of individual personality. . . . Individuation is a natural necessity inasmuch as its prevention by a leveling down to collective standards is injurious to the vital activity of the individual. Any serious check to individuality is an artificial stunting. . . . A social group consisting of stunted individuals cannot be a healthy, viable institution, only a society that can preserve the internal cohesion and collective values, while at the same time granting the individual the greatest freedom, has any prospect of enduring vitality. If a plant is to unfold its specific nature to the full, it must first be able to grow in the soil in which it was planted. . . . I do not think it is improbable . . . that a reversal of type often proves exceedingly harmful to the psychological well-being of the organism, usually causing acute exhaustion [p. 448-450]. (p. 281)

Noting examples of falsification of type, McCaulley and Moody (2001) draw attention to the obvious stemming from families that devalue the dominant function of their child. This can also be true of educators who exert pressure on students to conform to instructor preferences in order to excel in the learning environment. As researchers and educators begin to take into account that inborn type preferences may be supported or falsified by the culture, understanding of human behavior is greatly enriched (McCaulley & Moody, 2001).

Although many academic advisors use the MBTI with students to increase self-understanding and plan for academic majors and subsequent careers, the main value of the MBTI for education comes from insights into the learning styles of different types of students, helping instructors focus on how students use their minds (McCaulley & Moody, 2001).

McCaulley and Moody (2001) urge educators to consider:

- Extraverts need time to talk about what they are learning and Introverts need time for quiet reflection.
- Sensing types want practical reasons for learning the material. They look for concrete examples up front, prefer to learn by rote, and are happy with repetitive practice that consolidates learning. Intuitive types want the big picture, and where today's assignment fits in. They want to understand relationships among the specific parts. Once iNtuitives "see" the big picture, they quickly get bored with the details.
- Thinking types (natural skeptics) look for logical connections between cause and effect. Feeling types want to know how the topic being studied is relevant to people and their world. Thinking types are in the majority among males, and feeling types among females.
- Judging types are generally eager to get the task done and may declare victory before they have collected all the information they need. Perceiving types are more curious. They aim to miss nothing and may seek out more information until the last minute flurry is not enough to make the deadline. (p. 291)

Lawrence (1993) purports people change some learning strategies from situation to situation, from instructor to instructor while some strategies tend to be held constant in all situations; however, even in situations that call on people to produce behaviors quite different from the usual self, type preferences normally persist. Lawrence (1993) makes broad use of the term 'learning styles' to cover four aspects of psychological makeup:

- Cognitive style in the sense of preferred or habitual patterns of mental functioning: information processing, formation of ideas, and judgments.

- Patterns of attitudes and interests that influence what a person will attend to in a potential learning situation.
- A disposition to seek out learning environments compatible with one's cognitive style, attitudes, interests, and to avoid environments that are not congenial.
- Similarly a disposition to use certain learning tools, to use them successfully, and avoid other tools.

McCaulley and Moody (2001) report "Considerable research has established that type plays a role in academic aptitude and achievement" (p. 291). Given that academic learning tends to emphasize working with concepts and ideas, using words, symbols, and abstractions, it should come as a surprise that data on type preferences and academic aptitude scores show a slight advantage for introverts and a clear advantage for intuitives (McCaulley & Moody, 2001). McCaulley and Moody (2001, p. 291-292) note additional trends to watch for in viewing the education system through the lens of type:

- Perceiving types have an edge in aptitude, perhaps because their openness and curiosity bring more information across their path. Judging types have an edge in grades, perhaps because their goal-directed, orderly lives include meeting academic commitments.
- In the general population, extraverts and introverts are about equally divided. Introverts are somewhat more likely to seek higher education.
- The percentage of sensing types is estimated at 65-75 percent of the population. Higher education is more attractive to intuitive types where they are found in greater numbers, especially in humanities and arts. This does not mean that intuitive types are more intelligent than sensing types. Myers and Myers (1980) observed the "iNtuitives tend to define intelligence as 'quickness of understanding' and sensing types tend to define intelligence as 'soundness of understanding'" (p. 59). Clearly both kinds are important.

- Sensing types are more likely to prefer the closure of judging, and intuitives are more likely to prefer the openness of perceiving. In most population samples, therefore, the solid, dependable S-J types outnumber the N-P independent spirits.
- In the lower grades, S-J types are the majority among students and teachers. S-P types who want to learn by doing and with many hands on activities, find classroom structure confining. They are more likely to be underestimated by teachers. S-P students are more likely to drop out of school and less likely to seek higher education. S-P students rarely have a kindred-spirit S-P teacher.
- N-P students are the independent spirits. They are found in classes for the gifted and in independent study programs. Teachers in these programs are frequently intuitives. Self-direction in learning is both natural and comfortable.
- The quiet I-N types rank high in academics and look forward to college and graduate school, where they find more kindred spirits among students and faculty.

McCaulley and Moody (2001) proclaim "With more than two million administrations per year around the world, the MBTI has provided extensive and compelling evidence that Jung's theory of psychological types is indeed universal," noting that "people of diverse cultures have found its results meaningful and useful in education, counseling, career development, and organizations" (p. 301). As visible diversity among college students in terms of age, gender, and ethnicity continues to increase, psychological type provides a way of examining important differences in choice of academic discipline(s), persistence, and instructional discipline as well as learning style and teaching style preferences.

Summary

Our world is changing rapidly and the search for practical new paradigms in every discipline is urgent. Vella (2008) challenges educators to employ quantum thinking (looking at the world in a new way) and dialogue to evoke optimal learning. Knowledge of type coupled with a clear understanding how learning and teaching styles influence student learning enables faculty to identify the modes in which students learn best. This is useful in two ways: Helping

students understand and become aware of how they themselves learn and study best (metacognition), and helping instructors achieve a more holistic approach to selecting and designing teaching strategies, lessons, and activities that maximize student learning and understanding.

Bain (2004) insists that in order "to create a new kind of professor who understands the discipline and how it might be learned, we must change the way we develop young scholars and support the existing ones" (p. 177). Bain (2004) suggests that colleges and universities consider:

- Establishing departments or institutes that study and advance learning by researching educational issues, thinking about their implications for the university enterprise, and helping colleagues in other departments realize and benefit from the meaning of those studies.
- Developing research-based teaching initiatives and helping the faculty across the institution tackle problems.

A deeper understanding of the factors that influence faculty development will undergird efforts reassess the role institutions of higher learning play in helping to develop the human capacity to solve complex problems in our world.

Chapter 3: Methodology

This quantitative research study explores the relationship between the Myers-Briggs Type Indicator and instructional perspectives among faculty across academic disciplines at area colleges in a Midwestern state. Primarily it examines the role psychological type, as measured by the Myers-Briggs Type Indicator (MBTI), plays in predicting instructional perspectives, as measured by the Modified Instructional Perspectives Inventory (Modified-IPI). This study also includes a brief investigation into variations in instructional perspectives among faculty members of similar MBTI types, teaching in the same academic disciplines and whether or not these variations might be related to exposure to adult learning theories, methods, and/or instructional strategies. This chapter is organized into six sections: Research design, population setting and sampling methods, instrumentation, data collection methods, data analysis procedures, and limitations.

Research Design

Because the intent of this quantitative study was to investigate relationships without manipulating variables or applying any treatment(s), it is considered an observational study, using a predictive correlational design (Vogt, 2005). In correlational research, the researcher looks into degree of relationship between two or more variables, rather than the effect of one variable on another. Vogt (2005) confirms that in a correlational design, the researcher uses measures of association to study relations, warning that "correlation does not equal causation" (p. 64). Causation cannot be assumed.

Population Setting and Sampling Methods

Researchers hope to make inferences about the populations. In order to have confidence in a generalization, it is important that the sample be both large enough to yield statistical power as well as broad enough to include the diversity that represents this population. There are two

broad categories of sampling: Probability samples, and non-probability samples. Vogt (2007) contends that probability samples are always preferable whenever possible. It would have been ideal in this age of globalization to obtain large random samples among faculty teaching in various disciplines around the globe; however, it simply was not feasible to draw such diverse samples from numerous colleges and universities. Given the constraints surrounding this research, a non-probability sample from one geographic region made better sense. Fortunately, a focused study in one geographic area does help to determine whether or not there is any relationship among the variables of interest. And the existence of a relationship opens the door for future research.

Vogt (2007) points out that convenience samples and purposive samples are the most common non-probability samples. Just as the name implies, a purposive sample is gathered with a distinct goal or purpose in mind. According to Vogt (2007), researchers can take deliberate steps to try to make the people or cases they study "representative in a purposive sense in situations where a probability sample is just not possible (Shadish, Cook, & Campbell, 2002, p. 355)" (p. 81).

After much consideration, the University of Missouri System was selected to serve as this purposive sample. As the first publicly supported institution of higher education established in the Louisiana Purchase territory, the University of Missouri has provided teaching, research and service to Missouri and the nation since 1839. The University of Missouri System spans four universities, a health care system, an extension program, five research and technology parks, and a publishing press with internationally renowned faculty servicing more than 64,000 students of all ages from nations around the globe. All four campuses are comprehensive, research intensive, land-grant institutions offering undergraduate, graduate, and professional degree programs.

The sample population includes tenured, non-tenured, and adjunct faculty as well as graduate assistants teaching courses at the four University of Missouri campuses. Since programs of study may be housed in different departments, units, colleges or schools on each of the campuses, a review of programs was conducted and each program was then assigned to one of nine broad academic disciplines: Business & Industry, Communication & Fine Arts, Education, Engineering, Humanities, Mathematics & Computer Science, Medical Sciences, Natural Sciences, and Social Sciences. Appendix A provides a listing of the programs included within each of these nine broad academic disciplines.

In the world of research, bigger is always better. Vogt (2007) clarifies "bigger samples are more likely to be representative of the population, increasing the researcher's ability to detect true relations among variables" (p. 84); small samples increase the risk of Type II error (failure to detect an actual relationship). And while Type I errors (wherein the null hypothesis is rejected when it is in fact true) and Type II errors are inversely related at a given sample size, Vogt (2007) contends both kinds of errors can be reduced by increasing sample size. Vogt (2007) suggests that the researcher's tolerance for uncertainty can also influence decisions regarding sample size. Lastly, Vogt (2007) warns, "It is a waste of time and money to increase sample size to the point that you can detect things that are too small to be of interest" (p. 85). The real key is that the representativeness of the sample is typically more important than the size of the sample. This purposive sample adequately represents the population of interest in this study.

Standard formulas for determining the sample size do exist; however, they require information that was initially unknown, such as the variance of the sample and the normality of the distribution of the population. Of this concern, Vogt (2007) stated, "This puts you in the impossible situation of having to compute things on the sample you have not yet collected in order to decide how big a sample you should collect" (p. 86). Vogt (2007) goes on to say that

this problem can be avoided by estimating or assuming what is needed based on a review of literature of similar studies. Table 3 reviews of the dissertations surrounding the Instructional Perspectives Inventory along with the sample surveyed and the number of cases analyzed.

Table 3

Sample Size of Published Dissertations Involving the IPI & Modified-IPI

Author	Year	Sample	Surveyed	Received	Analyzed
Thomas, E. E.	1995	Parent Educators	200	94	76
Dawson, M. S.	1997	Nurse Educators	245	242	205
Seward, S. S.	1997	Parent Educators	260	157	157
Drinkard, G.	2003	Nurse Educators	44	35	35
Stanton, C.	2005	Adult Educators	415	246	238
Stricker. A. J.	2006	Teachers/Principals	761/30	169/30	169/30
Rowbatham, M. A.	2007	Nurse Educ./Students	12/398	12/398	12/398
McManus, L. K.	2007	Math Educators	145	34	34
Ryan, L. J.	2009	F. Language Ed./Students	19/524	9/110	9/103

Stanton analyzed the highest number of cases involving adult educators. Stanton (2005) states, “First, Hair, Anderson, Tatham, and Black (1995) as well as Tabachnick and Fidell (1989) recommended that for a standard regression analysis at least a desired level of 20 observations per each independent variable (the seven factors on the IPI) be obtained” (p. 107), equating to 140 completed returns. Through interviews with Hickman (1995) and Grindel (2004), Stanton (2005) learned that a minimum of five observations for each of the 45 items on the IPI was necessary, increasing the sample size to 225. Additionally, Stanton (2005) used the Creative Research Systems (2002) sample size calculator to determine that at a confidence level of 95% with a 4.5 confidence interval the required sample size of a population of 415 should be 222.

In Stanton's (2005) research, scores from the seven subscales served as independent variables; however, these scores along with the overall score obtained from the Modified-IPI served as dependent variables in the present study. Data obtained from each of the four dichotomous scales along with the MBTI type and temperament acted as independent variables. Comparable studies investigating the link between the Myers-Briggs and various learning style inventories averaged 200 research subjects. Based on this investigation, the initial goal was to obtain a minimum of 225 and preferably 300 complete cases for analysis.

Researchers hold responsibility for protecting the rights of research participants. In addition to successfully completing the NIH web-based training course entitled, "Protecting Human Research Participants", in August, 2008, the researcher completed training in Social and Behavioral Research through CITI Collaborative Institutional Training Initiative in March, 2010. The research invitation (Appendix B) included an attached copy of the Informed Consent (Appendix C). Both documents explained that any and all participation in the research project was completely voluntary. Additionally, research subjects maintained the right to withdraw consent at any time and/or to refrain from answering any questions without penalty. Respondents who elected to participate in the study, by clicking on the survey link, were further instructed to enter a fictitious name. Upon completion of the MBTI, a 10-12 digit computer generated user identification number was assigned to the data and reported to the respondent. Participants were then redirected to a subsequent survey site where they were instructed to re-enter the fictitious name and the system generated user ID. This protocol allowed the respondents to remain anonymous while enabling the researcher to link data sets from each of the instruments. The resulting data, identifiable only by the 10-12 digit user ID, remains free of any personal identifiers and has been secured on a password protected computer.

Instrumentation

Instrumentation included Form M of the Myers-Briggs Type Inventory (Appendix D), the Modified Instructional Perspectives Inventory (Appendix E), and a brief demographic survey (Appendix F). The total time to complete all three instruments was approximately 30 minutes.

Myers-Briggs Type Indicator. The MBTI is a self-report questionnaire developed to operationalize Jung's theory of psychological type and to make his theory understandable and accessible to a wider range of people (Myers, 1993). Jung advocates that people have innate preferences (or comfort levels) for how they like to use their minds and these preferences contribute to differences in behavior (Farnsworth, Gilbert & Armstrong, 2002). Table 4 provides an overview of the MBTI's four dichotomous scales.

Table 4	*MBTI's Four Dichotomous Scales*
E-I Scale	**Extraversion – Introversion:** This scale rates a preference for focusing on the external, outer world of people or events (E) versus an inner world of ideas and reflections (I).
S-N Scale	**Sensing – iNtuition:** This scale rates preference for taking in data by being observant and using the five primary senses: sight, sound, smell, touch, taste in a step by step fashion (S) versus focusing on the big picture and making connections between facts in a theoretical manner (N).
T-F Scale	**Thinking – Feeling:** This scale rates a preference for making decisions based on logical consequences, using an objective, analytical problem solving approach (T) versus considering what is important to the people involved and making decisions on person-centered values aimed at promoting harmony and supporting others (F).
J-P Scale	**Judging – Perceiving:** This scale rates a preference for dealing with the outer world in a planned, orderly, scheduled, and systematic way (J) versus a flexible, spontaneous, open and adaptable way (P).

Scores from these four dichotomous scales indicate the strength and direction of preference: Extraversion–Introversion (E-I), Sensing-iNtuition (S-N), Thinking–Feeling (T-F), and Judging–Perceiving (J-P). Access to the MBTI is restricted and made available only to users who have appropriate training and credentials, and who adhere to the principles of proper use, including knowledge of assessments and their applications. The researcher was certified in 1989 and has since administered, scored, and interpreted the results of the MBTI for the purposes of leadership development, team building, career development and counseling, relationship building, faculty and staff development, and teaching and learning.

Since its first appearance in 1942, the MBTI has been revised several times. According to CPP (2011), "new item formats and scoring methods were developed and tested first by Isabel Myers and later by professional psychometricians, with each revision leading to technical improvements over the previous form." Myers and McCaulley (1989) provided detailed discussions on the reliability as well as content and construct validity in the development and use of the MBTI. Their research related to the reliability and validity of the MBTI was extensive. Findings indicated that both reliability and validity were credible (Carlyn, 1976; Gable, 1985; Hicks, 1997; McCaulley & Moody, 2001).

Validity of the MBTI. Since the MBTI was designed to implement Jung's theory of psychological types, Hicks (1997) emphasizes the importance of verifying theoretical constructs through appropriate validity measures. The MBTI remains one of the most widely used personality inventories with positive evidence of construct validity for its scores (Thompson & Borrello, 1994; Henson, 2003). As reported by Hicks (1997), Carskadon and Cook (1982), Cohen, Cohen, and Cross (1981), a large body of data has accumulated concerning the correlations of the scales with the constructs as described in MBTI manuals (Myers & McCaulley, 1989). According to both Gable (1985) and Hicks (1997), Coan states that, "It

would be fair to say that the group differences and correlations are broadly supportive of the construct validity of the scales" (p. 72 and p. 107, respectively).

In 1998, Form M replaced Form G as the standard form for identifying an individual's four type preferences. Schaubhut, Herk, and Thompson (2009) report a number of different analyses related to the measurement properties of the Form M. Participants were randomly selected from CPP's commercial database to create an analysis sample. Results from the best-fit type analysis support previous research on validity. Drawing from a random sample of 10,000 respondents, Schaubhut, Herk, and Thompson (2009) conducted an exploratory factor analysis; the four-factor structure produced demonstrates that Form M items measure what they are intended to measure. Schaubhut, Herk, and Thompson (2009, p. 9) report "Validity of personality assessments is often established through construct validity by showing that results of the assessment relate in a predictable manner to results of other similar measures they should be related to (known as convergent validity) and are not related to results of measures they should not be related to (known as divergent validity)." To demonstrate convergent and divergent validity of the MBTI dichotomies, Schaubhut, Herk, and Thompson (2009) provide a detailed analysis of correlations between the MBTI Form M and six different assessments, including the CPI 260®, FIRO-B® Adjective Check List, Strong Interest Inventory®, Thomas-Kilmann Conflict Mode Instrument (TKI), and Birkman Method®. These correlations demonstrate expected relationships with the other instruments.

Reliability of the MBTI. For the MBTI, reliability means that the scores and the extent to which the instrument is able to report the development of the preferences is consistent (Hicks, 1997). Hicks (1997) reports "Analyses of the reliability of the MBTI have consistently shown significance higher than the 6.2% expected from chance alone (McCaully, 1980)" (p. 107). Myers and McCaully (1985) report "Split-half scores are designed primarily for use in

internal consistency, reliability calculations" (p. 165). Myers and McCaully (1985) conclude that "Split-half reliabilities of continuous scores for groupings in the CAPT data bank show reliabilities consistent with those of other personality instruments" (p. 165). Deriving internal consistency from product-moment correlation of X and Y continuous scores with Spearman-Brown prophecy formula correction, Myers and McCaulley (1989) report the split-half internal consistency coefficient for each of the MBTI preferences as: EI (.83), SN (.83), TF (.76), and JP (.80), for 9,216 respondents. "Reliabilities are also estimated by coefficient alpha and are roughly the same as Pearson's r" (Hicks, 1997, p. 107; Myers & McCaulley, 1985, p. 169).

CPP (2011) reports an internal consistency reliability of .90 or greater for each of the four preference scales in initial research using Form M. Subsequent research focusing on a variety of demographic indicators revealed an overall range of .80-.92 on internal consistency. Table 5 summarizes the internal consistency reliability for each of the four scales based on specific demographic indicators (Schaubhut, Herk, & Thompson, 2009).

Table 5	*Form M: Internal Consistency Reliability*			
	Employment Status	**Ethnic Group**	**Age Group**	**Global Region**
E-I Scale	.90-.92	.88-.92	.91-.92	.88-.91
S-N Scale	.86-.92	.80-.89	.86-.91	.81-.88
T-F Scale	.88-.91	.85-.91	.87-.91	.86-.88
J-P Scale	.90-.92	.87-.91	.89-.91	.88-.91

Schaubhut, Herk, and Thompson (2009) also provide an analysis of the test-retest reliability of Form M as well as an excellent comparison of the reliability of the MBTI against other popular personality assessments, including the NEO, Birkman Method, DISC, BarOn EQ-I, and 16PF. In reviewing Cronbach's Alpha for each of the scales as well as test-retest reliabilities, the MBTI Form M assessment was at least as good as and in many cases superior to the other personality assessments (Schaubhut, Herk, & Thompson, 2009).

In comparison with previous forms of the MBTI, Form M offers the following advantages:

- The online version can be completed and scored electronically.
- Scoring was derived using Item Response Theory.
- Gender differences in the T-F scales were eliminated through the use of DIF analysis.
- Items are presented in a forced choice format with only one of two responses.
- Psychometric measures demonstrate considerable improvement in reliability.
- Test-retest reliabilities are consistent over time.

Form M (Appendix D) was therefore utilized to collect data through means of electronic survey.

Modified Instructional Perspectives Inventory. The Instructional Perspectives Inventory (IPI) was developed by Dr. John A. Henschke (1989) as a self-reporting tool with a corresponding self-scoring key. According to Stanton (2005), the initial instrument contained 50 items and was constructed around five important elements: "(a) contextual identification, (b) personal identification, (c) actions in the classroom, (d) competencies for functioning, and (e) philosophical beliefs for guiding practice" (p. 111). After completing a factor analysis which included 600 adult educators, changes to the IPI were made and a second factor analysis with 210 college instructors was then conducted (Henschke, 1989, 1994; Stanton, 2005; McManus, 2007). Henschke (1989) altered the IPI so that it included 45 items arranged on a four-point Likert scale clustered in the following seven IPI factors (IPIf = factor):

IPIf1 Teacher empathy with learners,

IPIf2 Teacher trust of learners,

IPIf3 Planning and delivery of instruction,

IPIf4 Accommodating learner uniqueness,

IPIf5 Teacher insensitivity toward learners,

IPIf6 Learner-centered learning processes (experience-based learning techniques), and

IPIf7 Teacher-centered learning processes.

Stricker (2006), Drinkard (2003), Dawson (1997), Seward (1997) and Thomas (1995) used variations of the IPI with 45 items arranged on a four-point Likert scale. Stricker (2006) conducted an investigation into principals' attitudes toward teachers in creating the conditions conducive to learning in school-based staff development. Drinkard (2003) explored the instructional perspectives of nursing educators teaching via distance education formats. Dawson (1997) conducted a study of nurse educators in an effort to identify the group mean differences across eighteen nursing programs. Seward (1997), in similar fashion as Thomas (1995), identified the instructional practices held and practiced by parent educators while working with parents as learners (Stanton, 2005; McManus, 2007).

Stanton (2005) set out to provide construct validity for the IPI; however, during the process of validating the instrument, Stanton modified the IPI's scale of responses to a five-point Likert scale and changed the verbal anchors (McManus, 2007). Stanton further enhanced the modified-IPI by adding category levels regarding the use of andragogical principles.

Table 6

Use of Andragogical Principles Category Levels

Category Levels	Percentage	IPI Score
High above average	89-100%	225-199
Above average	88-82%	198-185
Average	81-66%	184-149
Below average	65-55%	148-124
Low below average	54%	<123

(Stanton, 2005, p. 280)

The modified-IPI has since been used in four published dissertations: McManus, 2007; Reinsch, 2007; Rowbotham, 2007; and Ryan, 2009. McManus (2007) investigated the beliefs, feelings,

and behaviors of full-time mathematics faculty teaching in community colleges. Reinsch (2007) further adapted the modified-IPI into the learner's perspective as she looked into the relationship between lifelong learning, emotional intelligence, and life satisfaction for adults 55 years of age and older. Rowbotham (2007) examined the relationship between faculty teaching perspectives and students' perceptions of the learning environment. Ryan (2009) explored the relationships between instructional perspective, satisfaction with language learning, and certain teacher and student characteristics.

Validity of the Instructional Perspectives Inventory. The Instructional Perspectives Inventory was first developed and validated by Henschke (1989, 1994) and then modified and re-validated by Stanton (2005). Content validity was established in the development of the IPI through factor analysis (Henschke, 1989; McManus, 2007; Stanton, 2005). According to McManus (2007), construct validity (which occurs when an item measures the construct that it is designed to measure) was determined by Stanton (2005). Stanton's (2005) investigation of the relationship between the IPI and the Self-Directed Learning Readiness Scale (SDLRS) revealed that the seven factors comprising the IPI jointly have a statistically significant relationship at the 99% confidence level with the SDLRS" (p. 219). To examine convergent and divergent validity, Stanton (2005) used the correlation between the SDLRS and IPI with trust and empathy indicating convergence and all dissimilar factors demonstrating divergence. Stanton (2005) purports "All null hypotheses were rejected and all alternate hypotheses accepted" (p.220).

Reliability of the Instructional Perspectives Inventory. Stricker (2006) reported a calculated Cronbach's alpha value of 0.81; however, he did not present calculated values for each individual subscale (McManus, 2007). According to Stanton (2005) "Landis and Koch (1977) gave some benchmarks for reliability, 0.81-1.0 should be considered 'almost perfect', 0.61-0.80 'substantial', and 0.41-0.60 'moderate'" (p. 210). Reliability for each factor of the IPI

was determined by Thomas (1995) and Stanton (2005) using Cronbach's alpha reliability coefficient (McManus, 2007). Stanton (2005) reported "Due to the lack of data concerning the reliability of the IPI, Thomas (1995) conducted a pilot study first to establish reliability for the IPI factors" (p. 112). Using Cronbach's alpha reliability coefficient, Thomas (1995) obtained each factor's reliability: IPIf1 (.21), IPIf2 (.49), IPIf3 (.78), IPIf4 (.60), IPIf5 (.62), IPI f6 (.71), and IPIf7 (.40) (Stanton, 2005). And although the alpha value for teacher empathy was reported to be below 0.40, Thomas (1995) retained the factor and included a warning (Stanton, 2005). Based on her analyses, Stanton (2005) contends "The overall reliability of the IPI (.8768) using all 45 items comprising the IPI is within the accepted range for a new measurement tool" (p. 211). Using Cronbach's alpha reliability coefficient, Stanton (2005) obtained each factor's reliability: IPIf1 (.63), IPIf2 (.81), IPIf3 (.71), IPIf4 (.71), IPIf5 (.78), IPIf6 (.72), and IPIf7 (.57), identifying Factor 7 as the only factor with a value less than substantial on internal consistency.

Items from the Modified IPI (Appendix E) were entered into an electronic survey through the Skylight Matrix Survey System. This allowed administration of the Modified IPI to be automated and directed to the respondent pool, known as "UM faculty". Raw scores were stored electronically and downloaded into an Excel spreadsheet.

Demographic Survey. A brief questionnaire was developed to acquire demographic information, i.e., gender, instructional discipline, number of years in teaching, teaching status, level of education, graduate concentration(s), undergraduate major(s) and minor(s), and exposure to adult learning theories, teaching methods, and/or instructional strategies. A copy of this survey can be located in Appendix F. Items were included in the online survey developed through the Skylight Matrix Survey System. Upon completion of the Modified IPI, respondents were instructed to answer the brief demographic survey. Data was stored in this same file.

Data Collection Methods

IRB Approval. Prior to collecting data, blanket IRB approval was secured through UMSL (Appendix G). IRB applications were then submitted to UMC, UMKC, and MST. Each campus has its own separate application process and in some cases requires differing certifications from training designed to heighten awareness on the need to protect human research participants. IRB approval from UMKC was granted in June 2010 (Appendix H). After completing an online application and following up on a regular basis, it was ultimately decided that IRB approval from UMC was not necessary since no one from that campus would be directly involved in the collection or analysis of data (Appendix I). IRB approval from MST was granted in August 2010 (Appendix J).

Access to Research Participants. The researcher personally contacted the Director of Institutional Research on each campus to explain the purpose of the research, provide evidence of IRB approval, and gain access to the email addresses of all teaching faculty, including tenured and non-tenured faculty, adjunct instructors, and graduate teaching assistants. Email addresses were supplied for MST, UMKC, and UMSL, allowing the researcher to send direct mailings. Protocol at UMC, however, required that a mass email be sent through the Division of Information Technology, known as Information Security & Account Management at a cost of $100 per mailing. This mass email was delivered to the MU teaching faculty, ensuring that this mailing was not rejected as spam.

Invitation to Participate in Faculty Research. Research invitations (Appendix B) with attached copies of the informed consent (Appendix C) and the listing of programs assigned to each academic discipline (Appendix A) were emailed directly to all teaching faculty. Clicking on the corresponding survey link constituted informed consent. This link directed respondents to the MBTI survey site with oversight provided through Consulting Psychologist Press. During

completion of the MBTI, participants were given the option to receive a detailed report of their MBTI profile by providing an email address. Profiles were sent electronically through batch processing. A PDF of the MBTI profile (Appendix K) was attached to an email stating, "Here are the results from your MBTI. If you have not yet completed the remaining instruments and entered the random prize drawing, please go to *http://skylight.wsu.edu/s/a38367b5-0f5d-40ba-8859-494b12fc6c88.srv*" Once respondents entered the survey conducted through the Skylight matrix survey system, they were instructed to enter the same fictitious name used during completion of the MBTI as well as the 9-12 digit user ID generated and provided at that time. This fictitious name and user ID number allowed data from the MBTI, the Modified IPI, and the demographic survey to be linked together as a complete data set.

Follow-up. A last call for research participants was emailed to faculty at MST, UMKC, and UMSL. This email included a slightly reworded version of the research invitation as well as an electronic copy of the informed consent and academic disciplines. Follow-up with MU teaching faculty could only be made at the expense of an additional mass email for $100. Since the initial invitation yielded 190 completed data sets from UMC, a decision was made to forego any additional contact.

Data Analysis Procedures

Data was analyzed using SPSS. Basic frequencies and measurements of central tendency were calculated as the groundwork for further statistical analysis. MBTI scores can be viewed as continuous quantitative variables or as categorical variables. Myers and McCaulley (1989) report the conventional procedure for converting the preference scores to continuous scores assumes that the distribution of preference scores is continuous and linear and the mid-point is 100. Researchers using the online version of Form M have access to continuous scores. Investigators have frequently utilized the convention to compare the four MBTI indices with

scales of personality tests (Gable, 1985; McCaulley, 1981). Hicks (1997) reports "attempts also have been made to indicate the correlation of the continuous scores of the four scales with other instruments to ascertain both concurrent and construct validity (Ross, 1961, 1966; Myers, 1962; Bush, 1968; Weber, 1975; McCaulley, 1981; Gable, 1985)" and confirms "significant relationships showing the direction of preferences utilizing the product-moment correlations are evident in those studies at the $p < .01$ and $p < .001$ levels" (p. 107-108) in those studies. In the present study, Pearson product-moment correlation was used as a preliminary exploration of relationships between preference scores and instructional perspectives as well as select demographics with $\alpha < .05$ chosen as the level of statistical significance.

Statistical analysis included calculations of mean, standard deviation, and standard error for summative subscale scores and summative overall IPI score, using the category levels proposed by Stanton (2005) 'Low below average', 'below average', 'average', 'above average', 'high above average'. Pearson product-moment correlation also aided in the exploration of possible relationships between subscale scores and the overall IPI score and demographic items with $\alpha < .05$ chosen as the level of statistical significance.

ANOVA (analysis of variance) allows the researcher to take a close look at the impact of one independent variable on a dependent variable. MANOVA (multivariate analysis of variance) is used when the researcher wants to compare groups on a number of different, but related, dependent variables (DVs). Factorial MANOVA (factorial multivariate analysis of variance) goes a step further. According to Mertler and Vannatta (2005), factorial MANOVA extends MANOVA to research scenarios with two or more independent variables (IVs). This approach allows the researcher to explore group differences using two or more categorical independent variable and two or more quantitative dependent variables. Mertler and Vannatta (2005) specify that since several independent variables are used, different combinations of DVs

are created for each main effect and interaction of the IVs. This method allowed analysis of demographic data (gender, academic unit associated with instruction, teaching status, level of education, graduate area of concentration, undergraduate major, exposure to adult learning theories and methods) as well as MBTI data as categorical variables, to be viewed in relationship to continuous quantitative variables, i.e., scores from each of the seven IPI subscales as well as the overall IPI score.

Primary Research Question. The primary research question was "What is the relationship between Myers-Briggs Type Indicator and the Modified Instructional Perspectives Inventory? Hypotheses include:

H_1 = A significant relationship between the MBTI and Modified IPI exists.

H_0 = There is no significant relationship between the MBTI and the Modified IPI.

This research question was explored through separate analyses using a variety of statistical tools. Preferences on each of the four MBTI dichotomous scales as well as reported MBTI temperament and whole type served as independent variables while the overall score from the modified-IPI along with individual scores from each of the seven subscales were designated as dependent variables. When exploring the interrelationship between two sets of variables, Norman and Streiner (1999, p. 165-166) present the following options:

- Compute more than one multiple regression equation, regressing the variables against each of the outcomes separately (assuming the outcomes are independent of one another, which is not likely). The equations will be correct, but it will be difficult to determine the correct probability levels of the statistical tests associated with them.
- Combine the outcome scores in one global measure of performance. This approach ignores the pattern of response. One individual may score high on one subscale and low on another while another participant scores just the opposite yet they yield the same overall score. The relationship between the two variables may be important, but

will be missed with this method. It also assumes that both variables have equal weights, which may be a limiting restriction.

- Find the best "weights" for the IVs as well as the best "weights" for the DVs that would maximize the correlation between the two sets of variables. This is the approach taken in canonical correlation.

Canonical correlation, thought of as an extension of multiple linear regression, predicts two or more variables, rather than just one (Norman & Streiner, 1999). Norman and Streiner (1999) go on to say that this method of exploring the relationship between two sets of variables allows the researcher to ignore the distinction between 'independent' and 'dependent' variables, considering them as 'predictors' and 'criteria'. Utilizing continuous quantitative data collected from the MBTI and the modified-IPI, a canonical correlation was conducted.

A separate factorial MANOVA was conducted with data from the four MBTI dichotomous scales as categorical independent variables, in relationship to scores from each of the seven IPI subscales as well as the overall IPI score as quantitative dependent variables. A successive factorial MANOVA was conducted using the MBTI temperament and whole type.

Subsequent Research Questions. Subsequent research questions include:

1. What are the reported MBTI types among college faculty across academic disciplines?
    a. What differences emerge in the reported MBTI types among college faculty teaching in different academic disciplines?
    b. What differences emerge in the reported MBTI types among college faculty teaching within the same academic discipline?
2. What are the instructional perspectives of college faculty across academic disciplines?

a. What differences emerge in the instructional perspectives among college faculty teaching in different academic disciplines?
b. What differences emerge in the instructional perspectives among college faculty teaching within the same academic discipline?

3. What are the differences in training and preparation (major, graduate concentration, degree, level and sources of exposure to instructional strategies) among college faculty teaching within the same academic discipline?
4. Are there variations in instructional perspectives among faculty members of similar MBTI types, teaching in the same academic disciplines, related to exposure to adult learning theories, methods, and/or instructional strategies?

Reported MBTI Types among College Faculty across Academic Disciplines. What are the reported MBTI types among college faculty across academic disciplines? What differences emerge in the reported MBTI types among college faculty teaching in different disciplines? What differences emerge in the reported MBTI types among college faculty teaching within the same academic discipline? Basic frequencies and descriptive statistics provided a glimpse of MBTI temperaments and types at the campus level as well as a closer look across and within instructional disciplines. Analysis of variance (ANOVA) was used to determine the differences between the means of the continuous scores on the four MBTI scales for instructors teaching across the nine academic disciplines. Mertler and Vannatta (2005) report logistic regression, similar to discriminant analysis, can be seen as the reverse of MANOVA in that it seeks to identify which combination of quantitative IVs (continuous preference scores on the MBTI) best predict group membership as defined by a single DV with two or more categories. Logistic regression can also be completed with two or more categorical IVs and one DV with two or more categories for the purpose of group prediction.

Instructional Perspectives of College Faculty across Academic Disciplines. What are the instructional perspectives of college faculty across academic disciplines? What differences emerge in the instructional perspectives among college faculty teaching in different disciplines? What differences emerge in the instructional perspectives among college faculty teaching within the same academic discipline? Analysis of variance (ANOVA) was used to determine the differences between the means of the overall IPI score for instructors teaching in the different academic disciplines as well as those employed by the four different institutions. ANOVA is conducted using one IV with two or more categories (academic disciplines) and one quantitative DV. MANOVA expands on ANOVA by looking at the impact of the IV on multiple DVs. A factorial multivariate analysis of variance (factorial MANOVA) allows the researcher to explore group differences using two or more categorical independent variables (academic disciplines) and two or more quantitative dependent variables (scores from each of the seven IPI subscales). A series of ANOVAs and factorial MANOVAs were completed to look at the impact of instructional disciplines, teaching status, and campus on instructional perspectives.

Differences in Training and Preparation. What are the differences in training and preparation (undergraduate major, graduate concentration, level of education, level and sources of exposure to instructional strategies) among college faculty teaching within the same academic discipline? Looking separately at respondents in each specific instructional discipline, basic frequencies and descriptive statistics were run on select demographics: Number of years teaching, level of education, graduate concentration, undergraduate major, and level of exposure to adult learning theories, instructional strategies, and/or methodologies. A factorial MANOVA was completed for each instructional discipline assessing the impact of level of education as well as level of exposure to adult learning theories, instructional strategies, and/or methodologies on the seven factors on the Modified Instructional Perspectives Inventory.

Variations in Instructional Perspectives Based on Exposure. Are there variations in instructional perspectives among faculty members of similar MBTI types teaching in same academic disciplines that might be related to exposure to adult learning theories, methods, and/or instructional strategies? Are there variations in instructional perspectives among faculty members of similar MBTI types teaching in the same academic disciplines? If so, are these differences related to exposure to adult learning theories, methods, and/or instructional strategies? Insight into this subsequent research question was made possible by conducting a series of ANOVAs and MANOVAs.

Limitations

Researchers like to make inferences about the populations. In order to have confidence in a generalization, it is important that the sample be both large enough as well as representative of the population. Non-probability samples limit the researcher's ability to make inferences about the general population. This remains a key consideration as research findings are reported.

Gaining access to this particular sample continues to be a challenge. Managing a busy academic year while being productive and visible, but not exhausted is a challenge at any institution of higher learning; however, it is an even greater challenge among those attempting to secure tenure at research intensive organizations (Sanacore, 2006). Sanacore (2006) reports "new faculty talked about being overwhelmed with the challenge and frustration of getting published in the context of other time-consuming responsibilities: (a) planning, teaching, and assessing their students' progress; (b) serving on curriculum, personnel, academic standing, and ad hoc committees; (c) becoming involved in partnerships with local school districts; (d) attending department and faculty meetings; and (e) becoming savvy about politics" (p. 4).

Respondents were asked to complete three instruments covering nearly 160 items. Participants in this research project were personally invited to participate on a voluntary basis,

and electronic notification of the pending deadline (with a friendly reminder of the benefits of this research) was sent to prospective participants. Entry into a random drawing for four-$100 and four-$50 gift certificates served as incentive to complete the study. Participants reserved the right to withdraw consent at any time as well as the freedom to refrain from answering any questions without penalty. Only complete data sets were analyzed.

Stanton (2005) set out to establish construct validity for the Instructional Perspectives Inventory. By providing evidence that scores on the test instrument correlate highly with some external measure or criterion of what the test purportedly measures, researchers demonstrate the validity of a test (Wasson, 2008). To conduct a validity correlational study, Wasson (2008) specifies that researcher must obtain scores from an instrument administered to research subjects as well as their scores from the criterion measure, resulting in two scores for each subject; the resulting correlation coefficient is referred to as a validity coefficient. While this study incorporates the use of the Myers-Briggs Type Indicator and the Modified Instructional Perspectives Inventory, emphasis will be placed on the role psychological type plays in predicting instructional perspective rather than validation of the two instruments. A significant amount of research has been conducted using the MBTI, demonstrating both construct validity and reliability. Content validity was established on the IPI during development (Henschke, 1989) and construct validity was affirmed through research by Stanton in 2005. Reliability for each factor of the IPI was determined by Thomas (1995) and Stanton (2005) using Cronbach's alpha reliability coefficient (McManus, 2007).

Chapter 4: Data Analysis

This quantitative research study explores the relationship between the Myers-Briggs Type Indicator and instructional perspectives among faculty across academic disciplines at the University of Missouri's four campuses. This chapter provides a comprehensive analysis of the data collected for this study. This chapter is organized into seven sections: Survey response, demographics, missing data, preliminary analyses, testing of the primary research question and hypothesis, subsequent research questions, and summary.

Survey Response

The initial goal was to obtain a minimum of 225 and preferably 300 completed surveys. An electronic research invitation (Appendix B) was emailed to tenured and non-tenured faculty, adjunct instructors, and graduate teaching assistants employed across the four campuses of the University of Missouri. A total of 518 respondents completed the Myers-Briggs Type Indicator. Respondents were free to withdraw consent at any time and a total 108 participants exercised their freedom by stopping out after completing the MBTI.

Respondents who elected to enter an email address into the system received a copy of their MBTI profile (Appendix K) as well as a friendly reminder to complete the remaining instruments and enter into the random prize drawing. This effort yielded a total of 426 complete cases for analysis. Table 7 summarizes response rates from each of the campuses.

Table 7	*Response Rates from the Four UM Campuses*		
Campus	**Number Surveyed**	**Number of Respondents**	**Response Rate**
MST	626	53	8.46%
UMC	6886	190	2.76%
UMKC	1886	120	6.36%
UMSL	912	63	6.90%

The preliminary goal was to receive from seven to eleven completed surveys per academic discipline per institution, yielding between 28-44 completed surveys from each of the nine academic disciplines. Table 8 provides a summary of respondents representing each of the nine academic disciplines, including instructional discipline(s), graduate concentration(s), undergraduate major(s) and minor(s).

Table 8	*Number of Respondents in each Academic Discipline*			
Academic Disciplines	**Instructional Discipline**	**Graduate Concentration**	**Undergraduate Major**	**Undergraduate Minor**
Business & Industry	41	41	30	29
Communication & Fine Arts	48	46	52	35
Education	58	71	35	15
Engineering	31	33	38	11
Humanities	45	52	78	61
Math & Computer Science	21	28	28	24
Medical Sciences	76	70	56	27
Natural Sciences	60	62	86	54
Social Sciences	88	109	103	66
Multiple Disciplines Selected	41	82	72	32
No Discipline Selected	4	7	3	142

Demographics

Of the 426 completed cases analyzed 166 (39%) were male and 260 (61%) were female. Together, they averaged 10.27 years teaching in higher education. While seven (1.64%) respondents did not disclose employment status, 253 (59.39%) were full-time employees and 166 (38.97%) were working for the university on a part-time basis.

Ages ranged from 21 to 78 years old. Table 9 provides an overview of the number and percent of respondents that fell into each age group.

Table 9 *Age of Respondents*

Range	Number	Percentage
< 25 years	37	8.68%
25 – 34 years	119	27.93%
35 – 44 years	95	22.30%
45 – 54 years	90	21.12%
55 – 64 years	60	14.08%
> 64 years	18	4.22%

Eight (1.87%) research participants did not disclose their age. The average age of respondents was 41.33 years.

When queried on the number of years teaching, the range spanned from less than one year up to fifty years. The average number of years teaching was 10.27 years. Unfortunately, 32 (7.51%) respondents did not disclose how long they had been teaching. And while four (0.94%) did not identify teaching status, the remaining participants reported the following: tenured faculty - 103 (24.18%), non-tenured faculty - 137 (32.16%), adjunct instructors - 71 (16.67%), and graduate teaching assistants - 111 (26.05%). Non-tenured, full-time faculty holding doctorate degrees were the highest contributors to this research project.

More than fifty percent of the respondents held doctorate degrees, including first professional degrees such as MD, JD, and MBA degrees. The research pool included contingents, such as adjunct instructors and graduate teaching assistants teaching courses on a part-time basis as well as tenured and non-tenured faculty teaching on a full-time basis without a terminal degree. The level of education reported was: Doctorate (PhD, EdD) – 192 (45.07%),

Professional Degree (JD, MD, MBA) – 26 (6.10%), Master's Degree – 146 (34.27%), Bachelor's Degree – 55 (12.91%), Associate's Degree – 4 (0.94%), Some College – 1 (0.24%), and No Response – 2 (0.47%).

Research participants were also asked about their level of exposure to adult learning theories, teaching methods, and/or instructional strategies, as well as source(s) of exposure. The level of exposure varied: High exposure – 72 (16.90%), moderate exposure – 143 (33.57%), mild exposure – 169 (39.67%), and no exposure 39 (9.15%). Those with exposure to adult learning theories, teaching methods, and/or instructional strategies cited multiple sources of exposure: 108 (25.35%) identified five or more sources of exposure. Table 10 summarizes the percent of respondents exposed to adult learning theories through undergraduate and graduate coursework, conferences, professional journals, literature, professional development workshops, teaching and learning centers, and mentoring.

Table 10	*Sources of Exposure*
48.59%	Graduate Coursework (207)
47.89%	Professional Development Workshops (204)
46.48%	Conferences (198)
42.25%	Mentoring (180)
37.79%	Literature (161)
37.09%	Professional Journals (158)
27.70%	Teaching & Learning Center (118)
23.24%	Undergraduate Coursework (99)
7.75%	Other Sources of Exposure (33)

Respondents also reported exposure to adult learning theories, teaching methods, and/or instructional strategies through other sources: Counseling, life experience, consulting with friends, family, and fellow faculty members, military, professional boards and educational programs, lectures, lead teaching assistants, university support systems, internet research, grants and research, teaching practicum and experience, fellowships, tutoring others, listserv subscriptions, self-study, and Wakonse. Wakonse is a word from the Lakota Indian language meaning to teach, to inspire. The Wakonse Foundation hosts conferences on college teaching. University of Missouri support programs specifically mentioned were the NFTS program - New Faculty Teaching Scholars, T.A. Teaching Training, and FaCET.

All respondents completed the MBTI. Responses on the four dichotomous scales follow: Extravert - 174 (41%), Introvert – 252 (59%), Sensing 145 (34%), iNtuition – 281 (66%), Thinking – 278 (65%), Feeling – 148 (35%), Judging – 269 (63%), and Perceiving – 157 (37%). Table 11 provides a crosstab summary of the four MBTI scales across instructional disciplines.

Table 11	*MBTI Preferences across Instructional Disciplines*							
	E	**I**	**S**	**N**	**T**	**F**	**J**	**P**
Business & Industry	14	16	13	17	23	7	24	6
Communication & Fine Arts	18	22	10	30	22	18	22	18
Education	17	27	14	30	25	19	24	20
Engineering	8	17	13	12	21	4	21	4
Humanities	17	18	4	31	22	13	23	12
Math & Computer Science	3	14	4	13	12	5	9	8
Medical Sciences	30	40	28	42	45	25	42	28
Natural Sciences	16	33	18	31	39	10	30	19
Social Sciences	33	38	28	43	44	27	47	24
Multiple Disciplines Selected	16	25	13	28	22	19	24	17
No Discipline Selected	2	2	0	4	3	1	3	1

Missing Data

Participants reserved the right to withdraw consent at any time and/or to refrain from answering any questions without penalty. A total of 518 respondents completed the Myers-Briggs Type Indicator. Consulting Psychologist Press holds copyright for the MBTI. They maintained system oversight and downloaded MBTI data into an Excel file for the researcher. A total of 435 participants logged into the Skylight Matrix Survey system to complete the Modified Instructional Perspectives Inventory and the brief demographic survey. An Excel file with data from both instruments was generated through the Skylight Matrix Survey System.

Data sets for each instrument were identified by the 9-12 digit user ID and fictitious names and merged to ensure that each instrument was completed. Ninety-two incomplete data sets were eliminated from analysis, yielding 426 complete data sets. Those 426 data sets retained for analyses were then reviewed for missing data items. There were no systematic patterns of missing data.

In keeping with previous protocol, mean replacement was used to fill in missing data for the Modified IPI. A review of the 45 items revealed the following: 6 items - 0 empty cells, 11 items - 1 empty cell, 11 items - 2 empty cells, 10 items - 3 empty cells, 4 items - 4 empty cells, 1 item - 5 empty cells, 1 item (22) - 6 empty cells, 1 item (28) - 8 empty cells. Item 22 questioned, "How frequently do you establish instructional objectives?" Item 28 petitioned, "How frequently do you prize the learner's ability to learn what is needed?" The mean was calculated for each item and empty cells were replaced with the mean for that particular item.

An investigation of responses on demographic items exposed the following: Gender – 0 missing, Age – 8 missing, Campus – 0 missing, Instructional Discipline – 4 missing, Years Teaching – 32 missing, Employment Status – 7 missing, Teaching Status – 4 missing, Level of Education – 2 missing, Graduate Concentration – 7 missing, Undergraduate Major – 3 missing,

Undergraduate minor – 142 missing, and Level of Exposure 3 missing. No systematic patterns in the missing data emerged. Preliminary analysis revealed that items missing 8 or less responses (less than 2% of cases analyzed) did not pose a significant impact. Two demographic items posed possible concerns: Number of years teaching (32 missing) and Undergraduate Minor (142 missing). Two separate analyses of the primary research question were conducted; one set included the 32 cases for which the number of years teaching was unreported, while the other set of analyses excluded the 32 cases. There were no significant differences between the results of the two groups. Analyses on subsequent research questions included all 426 cases. Since 142 (33%) respondents did not declare an undergraduate minor, this variable was eliminated from analysis.

Preliminary Analyses

Descriptive statistics were obtained using SPSS-Explore. This, along with the missing value analysis procedures, allowed for an investigation into possible patterns for missing data. Again, no patterns emerged. Each of the four MBTI scales was individually assessed against each of the seven IPI factors and overall score using the Explore option of the Descriptive Statistics menu in SPSS. In addition to presenting the basic descriptive statistics (mean, median, standard deviation, skewness, and kurtosis), histograms and boxplots were constructed. Histograms appeared relatively normal. Inspection of the different boxplots raised concerns about possible outliers; however, comparison of the original means against 5% trimmed means revealed no significant differences. To calculate the 5% trimmed mean, SPSS removes the top and bottom five percent of cases and recalculates a new mean value (Pallant, 2006). Comparing the original mean against this new trimmed mean allows one to determine whether the more extreme scores are exerting a strong influence on the mean (Pallant, 2006). A decision was made to retain these potential outliers, as no real concerns emerged.

Reliability of the MBTI. The MBTI data file transmitted by Consulting Psychologist Press contained categorical data, continuous data, and raw data for the 93 items; however, the link between individual items and the four MBTI scales is considered proprietary information. To support efforts to confirm the internal consistency reliability, the CPP researcher assigned to this study offered to run the analyses using the final data set produced in Excel. Cronbach's alpha coefficients for each of the four MBTI scales were reported as follows: E-I scale (.92), S-N scale (.91), T-F scale (.90), and J-P scale (.92), demonstrating high internal consistency.

Reliability of the Modified IPI. Cronbach's alpha coefficient was used to check the internal consistency of the Modified Instructional Perspectives Inventory. Two separate sets of analyses were conducted; one set included all 426 cases, while the other set excluded the 32 cases missing the number of years teaching. Table 12 provides a summary comparing the two sets of analyses.

Table 12 *Summary of Cronbach Alpha*	**426 cases**	**394 cases**
IPIf1: Teacher Empathy with Learners	.70	.69
IPIf2: Teacher Trust of Learners	.85	.85
IPIf3: Planning & Delivery of Instruction	.75	.75
IPIf4: Accommodating Learner Uniqueness	.72	.72
IPIf5: Teacher Insensitivity Toward Learners	.70	.70
IPIf6: Learner-Centered Learning Process	.70	.68
IPIf7: Teacher-Centered Teaching Process	.64	.65
Overall Instructional Perspectives Inventory	.90	.90

There were no material differences between the two sets. Ideally, the Cronbach alpha coefficient of a scale should be above .70. At .90, the Overall Instructional Perspectives Inventory clearly demonstrates internal consistency reliability.

Across the seven factors, three factors exceeded the .70 coefficient and three approached the .70 mark. The lowest Cronbach alpha coefficient was .64. Pallant (2006) reports, "With short scales (e.g. scales with less than 10 items), it is common to find quite low Cronbach values (e.g. .50)" (p. 90). IPIf2 has eleven items; however, IPIf4 and IPIf5 have only seven items, and IPIf1, IPIf 3, IPIf 6 and IPIf 7 each include only five items per scale. Appendix L contains the first set of analyses for Cronbach alpha coefficients with 426 cases. The decision was made to include all seven factors as well as the overall IPI score in further analyses.

Pearson's Correlation Coefficient. The primary focus of this study centered on the strength of relationship between variables. According to Pallant (2006), Pearson correlation describes the strength as well as the direction (positive or negative) of the relationship between two continuous variables. It can also be used when one of the variables is dichotomous.

MBTI Scales and the Modified IPI. A separate set of analyses was conducted with each of the four MBTI scales using continuous scores against the total IPI score and each of the seven factors on the Modified IPI (Appendix M). First noted was the direction of the relationship between the variables. A positive sign denotes a positive correlation (e.g. as one variable increases so does the other) and a negative sign signifies a negative correlation (e.g. as one variable increases, the other decreases). The relationship between each MBTI scale and the total IPI score and seven IPI factors were as follows: Extraversion-Introversion (negative), Sensing-iNtuition (positive), Thinking-Feeling (positive), and Judging-Perceiving (positive).

Next, the strength of the relationship was determined. The value of the Pearson Correlation r can range from -1.00 to 1.00. A correlation of 1 illustrates a perfect correlation and 0 indicates no relationship at all. The r values for each MBTI scale and the total IPI score and seven IPI factors ranged as follows: Extraversion-Introversion (-.01 to -.30), Sensing-iNtuition (.13 to .26), Thinking-Feeling (.10 to .25), and Judging-Perceiving (.03 to .21). The maximum

amount of variance shared between any two variables was 8.76%. Values below .30 are considered small; however, Pallant (2006) points out that in large samples (N=100+), small correlations may be significant. Twenty-five (78.1%) are significant at the 0.05 level and 23 (71.8%) are significant at the 0.01 level. Table 13 summarizes the levels of significance as reported on the SPSS output.

Table 13	*Pearson's r - Levels of Significance*			
	E-I	**S-N**	**T-F**	**J-P**
IPI Total	**.000**	**.000**	**.000**	**.028**
IPIf1	**.000**	**.000**	**.002**	.286
IPIf2	**.000**	**.000**	**.000**	.555
IPIf3	**.000**	**.001**	**.006**	.343
IPIf4	**.000**	**.002**	**.002**	.213
IPIf5	**.000**	**.001**	**.006**	.113
IPIf6	**.000**	**.007**	**.002**	.133
IPIf7	.833	**.000**	**.038**	**.000**

Pallant (2006) states, "Many authors suggest that statistical significance should be reported but ignored, and focus should be directed at the amount of shared variance" (p. 127).

The purpose of preliminary analyses was to examine the bivariate relationships between independent and dependent variables. To reduce the number of steps and save time, the procedure for obtaining correlation coefficients between one independent variable (each MBTI scale) and multiple dependent variables (Total IPI Score and Factors 1-7) was employed by selecting Bivariate in the Correlation function under the Analyze menu (Appendix M). As expected, the r values and level of significance were reported; however, the output produced drew attention to another possible issue: The r values present for the total IPI score in relation to

the seven factors were IPIf1 (.753), IPIf2 (.874), IPIf3 (.778), IPIf4 (.803), IPIf5 (.519), IPIf6 (.689), and IPIf7 (.058). An r value greater than .80 may indicate co-linearity and an "r" value greater than .90 suggests possible overfitting. Collinearity refers to the linear relationship between two variables and multicollinearity describes a situation in which there is a strong correlation between two or more predictors in a multiple regression model. When two variables are highly correlated, they are basically measuring the same phenomenon. In general, if multicollinearity among independent variables is discovered, the researcher may drop one of the two variables that are highly correlated to avoid possible overfitting.

The total IPI score is highly correlated with IPIf2 and IPIf4; however, they act not as predictors but as dependent variables in this research study. French, Macedo, Poulsen, Waterson, and Yu (2008) warn that in situations where a high correlation between dependent variables causes one dependent to become a near-linear combination of the other dependent variables, it becomes "statistically redundant and suspect to include both combinations" (p. 3).

MBTI Scales and Demographic Variables. Analysis was executed to investigate bivariate relationships between the four MBTI continuous scales and dichotomous demographic variables. Table 14 summarizes the r values and levels of significance between the four MBTI continuous scales and key demographic variables.

Table 14	*Pearson's r Values w/ Significance Noted*			
	E-I	**S-N**	**T-F**	**J-P**
Gender	-.051	-.025	**.202****	-.125
Age	.020	**.147****	-.058	-.012
Years Teaching	.044	**.103***	-.076	.022

** Significant at the 0.01 level * Significant at the 0.05 level

Values below .30 are considered small. The correlation coefficient for T-F scale and gender was significant at $p < .001$; however, the shared variance is only 4.08%. The S-N scale in relation to both age and years teaching was significant with $p = .003$ and $p = .041$ respectively. The shared variance between S-N and age was 2.16% and S-N and years teaching was 1.06%.

Modified IPI and Demographic Variables. An exploration of bivariate relationships between these same demographic variables and the total IPI score with its seven factors was carried out. Table 15 summarizes the r values and levels of significance between the Modified IPI total score and seven factors and these same demographic variables.

Table 15	*Pearson's r Values w/ Significance Noted*		
	Gender	**Age**	**Years Teaching**
IPI Total	.150**	.196**	.125*
IPIf1	.094	.182**	.162**
IPIf2	.149**	.186**	.105*
IPIf3	.104*	.224**	.183**
IPIf4	.142**	.122*	.084
IPIf5	.058	.090	.056
IPIf6	.140**	.044	-.012
IPIf7	-.043	.038	.002

** Significant at the 0.01 level * Significant at the 0.05 level

With r values less than .30, the researcher is confident that there is no relationship between demographic variables and total IPI score.

Modified IPI and Instructional Disciplines. Nearly ten percent of respondents (9.62%) reported teaching in more than one instructional discipline. This variable was treated in two distinct ways:

1. One variable with 11 categories: No Response, Business & Industry, Communication & Fine Arts, Education, Engineering, Humanities, Mathematics & Computer Science, Medical Sciences, Natural Sciences, Social Sciences, and Multiple Disciplines. All respondents noting more than one discipline were place in the final category.
2. Ten separate dichotomous variables - dummy coded as 0 (Not Selected) and 1 (Selected): Business & Industry, Communication & Fine Arts, Education, Engineering, Humanities, Mathematics & Computer Science, Medical Sciences, Natural Sciences, Social Sciences, and Multiple Disciplines. Each variable noted was coded as selected. As respondents noted two or more disciplines, the disciplines noted, along with Multiple Disciplines, were coded as selected.

Since Pearson's Correlation Coefficient can be calculated using dichotomous variables, each of the ten instructional disciplines (separate variables) were run against the total IPI score and the seven factors of the Modified Instructional Perspectives Inventory (Appendix N).

Once again, the correlation coefficients were all less than .30 across the variables. There were, however, some notable differences in the direction of the relationships. Two disciplines shared positive relationships with instructional perspectives: Communication & Fine Arts (three significant at the 0.01 level and one significant at the 0.05 level) and Education (five significant at the 0.01 level and one significant at the 0.05 level). Conversely, three disciplines shared negative relationships with instructional perspectives: Engineering (three significant at the 0.01 level and one significant at the 0.05 level), Mathematics & Computer Science (one significant at the 0.01 level and one significant at the 0.05 level), and Natural Sciences (two significant at the 0.01 level and two significant at the 0.05 level). Table 16 summarizes the r values and levels of significance between instructional disciplines and the Modified IPI total score as well as the seven IPI factors.

Table 16	*Pearson's r Values w/ Significance Noted*							
Instructional Disciplines	**IPI-T**	**IPIf1**	**IPIf2**	**IPIf3**	**IPIf4**	**IPIf5**	**IPIf6**	**IPIf7**
Business & Industry	-.002	.001	-.014	.025	-.050	.035	-.009	.020
Communication & Fine Arts	.081	**.131****	**.125****	.056	**.103***	.020	.047	**-.169****
Education	**.231****	.069	**.180****	**.127****	**.190****	**.121***	**.274****	.065
Engineering	**-.146****	**-.121***	**-.128****	-.086	-.092	-.054	**-.155****	-.013
Humanities	.071	.036	.032	.064	.063	.047	.080	.015
Math & Computer Science	-.093	.022	-.064	**-.099***	-.043	.024	**-.187****	-.066
Medical Sciences	.051	-.038	.070	.059	.044	-.027	.037	.057
Natural Sciences	**-.127****	-.025	**-.115***	**-.107***	-.069	-.062	**-.200****	.041
Social Sciences	-.001	-.008	-.015	.055	-.094	-.003	**.101***	-.022
Multiple Disciplines	.085	.018	.076	.105*	.017	.084	.069	.005

** Significant at the 0.01 level * Significant at the 0.05 level

Mertler and Vannatta (2005) contend that Pearson's correlation coefficient r is the most commonly used bivariate correlation technique. Field (2005) supports Pallant (2006) by maintaining that the variables used in Pearson's Product Moment Coefficient can indeed be categorical provided there are only two categories. Field (2005) stresses this is essentially the same as doing a *t*-test. Initial findings produced through descriptive statistics, explore, and Pearson's correlation coefficient warrant further investigation.

Testing of the Primary Research Question and Hypothesis

The primary research question is "What is the relationship between Myers-Briggs Type Indicator and the Modified Instructional Perspectives Inventory?" Hypotheses include:

H_1 = A significant relationship between the MBTI and Modified IPI exists.

H_0 = There is no relationship between the MBTI and the Modified IPI.

This research question was explored through separate analyses using a variety of statistical tools. Preferences on each of the four MBTI dichotomous scales as well as reported MBTI whole type

and temperament served as independent variables while the overall score from the modified-IPI along with scores from each of the seven IPI subscales were designated as dependent variables.

Utilizing continuous quantitative data from the four MBTI scales and the modified-IPI, Canonical correlation tests were conducted. This method of exploring the relationship between two sets of variables allows the researcher to ignore the distinction between 'independent' and 'dependent' variables, considering them as 'predictors' and 'criteria'. The canonical correlation coefficients test for the existence of overall relationships between two sets of variables, and redundancy measures the magnitude of relationships. Two separate sets of analyses were conducted; one set included all 426 cases, while the other set excluded the 32 cases missing the number of years teaching. Both produced an SPSS warning: "The WITHIN CELLS error matrix is SINGULAR. These variables are LINEARLY DEPENDENT on preceding ones . . F7 Multivariate tests will be skipped." The table containing Eigenvalues and Canonical Correlations was not produced nor was the table containing the Dimension Reduction Analysis.

Table 17 provides an overview of the *t*-value and the significance of *t* for each of the covariates across the Modified Instructional Perspectives Inventory.

Table 17	*Canonical Correlation t-Values (Significance) - 426 cases*			
	E-I	**S-N**	**T-F**	**J-P**
IPI Total	-5.55597 **(.000)**	3.81771 **(.000)**	3.40777 **(.001)**	-1.35852 (.175)
IPIf1	-4.28814 **(.000)**	2.64187 **(.009)**	1.82861 (.068)	***-1.36103 (.174)***
IPIf2	-3.87929 **(.000)**	2.69830 **(.007)**	4.32059 **(.000)**	-2.32079 **(.021)**
IPIf3	-4.76246 **(.000)**	2.56038 **(.011)**	***1.52727 (.127)***	-1.43468 (.152)
IPIf4	-3.35889 **(.001)**	2.09377 **(.037)**	2.07026 **(.039)**	-.86452 (.388)
IPIf5	-3.06515 **(.002)**	2.22956 **(.026)**	1.56621 (.118)	-.46674 (.641)
IPIf6	-5.88520 **(.000)**	1.35891 (.175)	***1.93722 (.053)***	-.62204 (.534)
IPIf7	.91910 (.359)	3.74953 **(.000)**	.21511 (.830)	2.27511 **(.023)**

Results produced in the second analysis (394 cases) were very similar. Notable differences included the following: T-F scale & IPIf3 (2.05952/.040) and IPIf6 (2.46967/.014) as well as J-P scale & IPIf2 (-1.89619/.059). Results from univariate F-tests with (1, 421) *df* were reported: IPI Total Score (F = 24620.69, $p < .001$), IPIf1 (F = 12944.22, $p < .001$), IPIf2 (F = 13280.56, $p < .001$), IPIf3 (F = 9152.79, $p < .001$), IPIf4 (F = 13228.73, $p < .001$), IPIf5 (F = 13453.40, $p < .001$), IPIf6 (F = 3926.14, $p < .001$), and IPIf7 (F = 6225.97, $p < .001$). No real differences in the results from F-tests between the first analysis (426 cases) and second analysis (394 cases) were exposed; therefore, further analyses were limited to the complete data set with 426 cases.

The SPSS warning, coupled with earlier concerns regarding highly correlated dependent variables, led to a decision to conduct a series of ANOVAs to look separately at each dependent variable as well as a successive canonical correlation. The total IPI score was eliminated from consideration as a dependent variable in conjunction with the seven IPI factors (MANOVAs).

ANOVAs. A series of one-way between-groups analysis of variance were conducted for each primary independent variable (four dichotomous MBTI scales, MBTI temperament, and MBTI whole type) against each of the prime dependent variables (IPI total score and seven IPI factors). The first four series investigated the role of each dichotomous scale separately as categorical variables: Extraversion-Introversion, Sensation-iNtuition, Thinking-Feeling, and Judging-Perceiving. The second centered on the four MBTI temperaments. And the final series of ANOVAs focused on the variance in scores between the 16 MBTI whole types. Appendix O provides SPSS ANOVA outputs for each independent variable against the IPI total score.

Levene's test for homogeneity of variances assesses whether the variance in scores is the same for each of the groups. If values from Levene's test are $p > .05$, then the assumption of homogeneity of variance has not been violated (Pallant, 2006). Most of the values produced by Levene's test were greater than .05, indicating that they do not violate the assumption of

homogeneity of variance. Table 18 provides a matrix with results from Levene's test for each of the ANOVAs conducted with violations in bold type.

Table 18	*ANOVAs: Significance Values for Levene's Test*							
	IPI-T	**IPIf1**	**IPIf2**	**IPIf3**	**IPIf4**	**IPIf5**	**IPIf6**	**IPIf7**
Extraversion-Introversion	**.040**	.135	.092	**.002**	.085	.235	.807	.986
Sensation-iNtuition	.374	**.007**	.251	.100	.279	.669	.780	.870
Thinking-Feeling	.883	.219	.759	.288	.695	.453	.280	.452
Judging-Perceiving	.675	.356	.893	.715	.864	.817	.558	.239
MBTI Temperaments	.315	**.041**	.361	.288	.673	.614	.805	.783
MBTI Whole Types	.237	.356	.679	.075	.358	.814	.607	.833

Four produced values less than .05, indicating a violation of the assumption of homogeneity. When this occurs, SPSS offers two alternative versions for the F-ratio: Welch and Brown-Forsythe. According to Field (2005), both techniques help control the Type I errors. Outputs from the Welch and Brown-Forsythe tests were identical on the first three violations:

1) Total IPI score by Extraversion-Introversion – $F(1, 409) = 31.59$, $p < .001$,
2) IPIf3 by Extraversion-Introversion - $F(1, 415) = 22.99$, $p < .001$, and
3) IPIf1 by Sensation-iNtuition - $F(1, 251) = 6.68$, $p = .010$.

Reports for the fourth violation (IPIf1 by MBTI temperament) follows: Welch $F(3, 124) = 4.20$, $p = .007$ and Brown-Forsythe $F(3, 176) = 3.82$, $p = .011$.

In addition to the between groups and within groups sums of squares and degrees of freedom, the ANOVA table provides a significance value. If this number is less than or equal to .05, then there is a significant difference among the mean scores associated with the dependent variable. Table 19 provides a matrix with significance values produced for each ANOVA.

Table 19	*ANOVAs: Between Groups Significance*							
	IPI-T	**IPIf1**	**IPIf2**	**IPIf3**	**IPIf4**	**IPIf5**	**IPIf6**	**IPIf7**
Extraversion-Introversion	**.000**	**.000**	**.000**	**.000**	**.000**	**.014**	**.000**	.731
Sensation-iNtuition	**.000**	**.007**	**.001**	**.040**	**.010**	**.029**	.137	**.000**
Thinking-Feeling	**.001**	**.030**	**.000**	.306	.054	**.006**	.194	**.029**
Judging-Perceiving	.146	.342	.968	.523	.513	.400	.230	**.000**
MBTI Temperaments	**.000**	**.006**	**.000**	.132	**.009**	**.030**	**.034**	**.000**
MBTI Whole Types	**.000**	**.001**	**.000**	**.005**	**.003**	.066	**.000**	**.000**

Results significant at or below the .05 level appear in bold type. Across the dependent variables, statistically significant differences in mean scores occurred more frequently in the E-I and S-N scales in comparison with T-F and J-P scales. ANOVAs carried out to evaluate the impact of MBTI temperament on these same dependent variables showed statistically significant differences at the $p < .05$ level in scores in all cases but IPIf3. The series of one-way between-groups analysis of variance conducted to explore the impact of the 16 MBTI whole types on the IPI total score and seven factors demonstrated statistically significant differences at the $p < .01$ level in scores for each dependent variable except IPIf5.

MANOVAs. Analysis of variance (ANOVA) allows the researcher to take a close look at the impact of one independent variable on one dependent variable. Multivariate analysis of variance (MANOVA) is used when the researcher wants to compare groups on a number of different, but related, dependent variables. Mertler and Vannatta (2005) point out that one-way multivariate analysis of variance is used to simultaneously study two or more related DVs while controlling for the correlations among the dependent variables. A series of six MANOVAs were conducted for each primary independent variable (four MBTI scales, MBTI temperament, and MBTI whole type) against the seven IPI factors. Pallant (2006) stresses that "MANOVA works

best when the dependent variables are only moderately related" (p. 255); therefore, the IPI total score was expunged from consideration.

According to Pallant (2006), a significance value larger than .001 in Box's Test of Equality of Covariance Matrices assures that the assumption of homogeneity of variance-covariance has not been violated. Pallant (2006) warns that Box's M can tend to be too strict when the sample size is large. The significance reported through Box's tests follows: E-I scale (.002), S-N scale (.055), T-F scale (.788), J-P scale (.326), MBTI temperament (.120), and MBTI whole type (.000). The E-I scale and MBTI whole type violated this assumption. If homogeneity of variance-covariance is assumed, Mertler and Vannatta (2005) recommend using Wilks' Lambda and when the assumption is violated, they recommend utilizing Pillai's Trace:

- E-I scale – Pillai's Trace = .081, $F(7, 418)=5.23$, $p < .001$,
- S-N scale – Wilks' Lambda = .884, $F(7, 418)=7.85$, $p < .001$,
- T-F scale – Wilks' Lambda = .932, $F(7, 418)=4.37$, $p < .001$,
- J-P scale - Wilks' Lambda = .959, $F(7, 418)=2.58$, $p < .001$,
- MBTI temperament – Wilks' Lambda = .822, $F(21, 1195)=4.03$, $p < .001$, and
- MBTI whole type – Pillai's Trace = .510, $F(105, 2870)=2.15$, $p < .001$.

Statistically significant differences in the mean scores emerged between: Extraverts and Introverts, Sensors and iNtuitives, Thinkers and Feelers, Judgers and Perceivers, the four MBTI temperaments, and the sixteen MBTI whole types.

When $p > .05$ for Levene's test, the assumption of equality of variance has not been violated. The values furnished in the MANOVA outputs mirror those generated through the ANOVAs. Three violations re-appear: 1) IPIf3 by Extraversion-Introversion, 2) IPIf1 by Sensation-iNtuition, and 3) IPIf1 by MBTI temperament. Pallant (2006) suggests setting a more conservative alpha, recommending the Bonferroni adjustment (divide the original alpha level of

.05 by the number of dependent variables). Following Pallant's (2006) advice, .05 was divided by 7 (seven IPI factors), yielding a new alpha level of .007. As the SPSS tests of between-subject effects were reviewed, results were considered significant $p \leq .007$. Table 20 provides a matrix of the significance values reported for each dependent variable across the six MANOVAs with significant results ($p \leq .007$) appearing in bold type.

Table 20	*MANOVAs: Tests of Between-Subject Effects*						
	IPIf1	**IPIf2**	**IPIf3**	**IPIf4**	**IPIf5**	**IPIf6**	**IPIf7**
Extraversion-Introversion	**.000**	**.000**	**.000**	**.000**	.014	**.000**	.731
Sensation-iNtuition	**.007**	**.001**	.040	.010	.029	.137	**.000**
Thinking-Feeling	.030	**.000**	.306	.054	**.006**	.194	.029
Judging-Perceiving	.342	.968	.523	.513	.400	.230	**.000**
MBTI Temperaments	**.006**	**.000**	.132	.009	.030	.034	**.000**
MBTI Whole Types	**.001**	**.000**	**.005**	**.003**	.066	**.000**	**.000**

While the number of Introverts exceeded the number of Extraverts, Extraverts maintained higher mean scores across each of the seven factors with statistically significant differences on factors 1, 2, 3, 4, and 6. Across all seven factors, iNtuitives held an advantage over Sensors in both numbers and mean scores with statistically significant differences on IPIf1, IPIf2 and IPIf7. Thinkers outnumbered the Feelers; however, the Feelers held slightly higher mean scores on each of the seven factors with statistically significant differences on IPIf2 and IPIf5. Finally, there were fewer Perceivers than Judgers, yet the Perceivers held a very slim edge on Judgers in mean scores across the seven factors; however, the only statistically significant difference was found on IPIf7.

A comparison of group means across the four MBTI temperaments (NT, NF, SJ, and SP) acknowledged that iNtuitive-Feelers (NF) held the highest means across all seven factors on the

Modified Instructional Perspectives Inventory. Differences in temperament were statistically significant at the .007 on IPIf1, IPIf2, and IPIf7. And a comparison of group means of the MBTI whole types revealed the two highest means and two lowest means were achieved by the following:

- IPIf1: Teacher Empathy with Learners – **ENFP** & ENTJ and ISFJ & **ISTP**,
- IPIf2: Teacher Trust of Learners – **ENFP** & ENFJ and ISFP & **ISTP**,
- IPIf3: Planning & Delivery of Instruction – ESFP & **ENFP** and ISFJ & ISFP,
- IPIf4: Accommodating Learner Uniqueness – INFP & **ENFP** and INTP & **ISTP**,
- IPIf5: Teacher Insensitivity Toward Learners – ESFP & **ENFP** and ESTP & **ISTP**,
- IPIf6: Learner-Centered Learning Process – ESFJ & **ENFP** and ISFP & ESFP,
- IPIf7: Teacher-Centered Teaching Process – ESFP & ENTP and ESTP & ESFJ.

ENFPs held the highest means on IPIf1 and IPIf2 as well as the second highest means on IPIf3, IPIf4, IPIf5, and IPIf6. ESFPs held the highest means on IPIf3, IPIf5, and IPIf7. Conversely, ISFPs scored the lowest mean on IPIf3 and the second lowest means on IPIf2 and IPIf6 and ISTPs held the lowest means on IPIf1, IPIf2, IPIf4, and IPIf5. As the four MBTI dichotomous scales interact to form the sixteen MBTI whole types, these trends warrant a closer look at the interaction among these four variables.

Factorial MANOVA. Factorial MANOVA helps determine whether two or more categorical grouping variables (and their interactions) significantly affect optimally weighted linear combinations of two or more continuous variables. Initially a factorial MANOVA was conducted with data from the four MBTI dichotomous scales as categorical independent variables, in relationship to scores from each of the seven IPI subscales as well as the overall IPI score as quantitative dependent variables, drawing from all 426 cases. The output for MANOVA generally includes Box's Test for homogeneity of variance-covariance. In the initial factorial

MANOVA which included the overall IPI total score as a dependent variable, the following SPSS warning was received: Box's Test of Equality of Covariance Matrices is not computed because there are fewer than two nonsingular cell covariance matrices. Once the IPI total score was eliminated from analysis, the output appeared normal and Box's Test of Equality of Covariance Matrices was produced (Appendix P). Wilks' Lambda values ranged from .940 - .985. As Box's Test was significant at $p < .001$, Mertler and Vannatta's (2005) recommendation to use Pillai's Trace was followed. Table 21 provides a summary of the multivariate tests across the effects: Pillai's Trace, $F(7, 404)$ *df* with significance values.

Table 21 *Factorial MANOVA – Multivariate Tests*

Effect	**Pillai's Trace**	***F***	**Significance**
E-I	.044	2.69	**.010**
S-N	.060	2.78	**.008**
T-F	.042	3.72	**.001**
J-P	.028	2.51	**.016**
*E-I * S-N*	.030	1.68	.111
*E-I * T-F*	.021	1.78	.090
*E-I * J-P*	.046	1.22	.290
*S-N * T-F*	.054	3.28	**.002**
*S-N * J-P*	.036	2.19	**.035**
*T-F * J-P*	.053	3.25	**.002**
*E-I * S-N * T-F*	.027	1.58	.139
*E-I * S-N * J-P*	.015	.91	.501
*E-I * T-F * J-P*	.029	1.72	.103
*S-N * T-F * J-P*	.046	2.79	**.008**
*E-I * S-N * T-F * J-P*	.039	2.37	**.022**

Multivariate tests are considered statistically significant at $p < .05$: E-I (.010), S-N (.008), T-F (.001), J-P (.016), S-N * T-F (.002), S-N * J-P (.035), T-F * J-P (.002), S-N * T-F * J-P (.008), and E-I * S-N * T-F * J-P (.022).

A review of the Significance column in Levene's Test of Equality of Error Variances reveals: IPIf1 (.356), IPIf2 (.679), IPIf3 (.075), IPIf4 (.358), IPIf5 (.814), IPIf6 (.607), and IPIf7 (.833). Since all of the significant values are greater than 0.05, equal variances are assumed, warranting further investigation. The F-ratios with noted levels of significance, highlighted in bold, are provided in Table 22.

Table 22	*Factorial MANOVA - F Ratios w/ Significance Noted*						
Source	**IPIf1**	**IPIf2**	**IPIf3**	**IPIf4**	**IPIf5**	**IPIf6**	**IPIf7**
Corrected Model	**2.651****	**3.195***	**2.242****	**2.357****	1.617	**3.705****	**3.247****
E-I	**6.751****	**9.768****	**15.413****	**4.526***	**5.332***	**9.704****	.283
S-N	3.331	**5.135***	.288	**4.348***	.118	**5.153***	**5.689***
T-F	1.458	3.583	.408	.334	**9.371****	2.786	3.119
J-P	.002	.907	.073	.060	.496	**4.459***	**7.551****
*E-I * S-N*	.031	2.232	**4.141***	.013	.870	.040	.219
*E-I * T-F*	.205	.007	.718	3.671	.612	.028	.246
*E-I * J-P*	.387	.056	.378	.181	1.310	1.610	1.041
*S-N * T-F*	.087	1.726	.020	.314	3.529	**10.447****	2.880
*S-N * J-P*	.109	.402	.001	1.140	.006	**9.177****	1.061
*T-F * J-P*	1.480	.767	1.883	.807	2.899	**6.196***	1.257
*E-I * S-N * T-F*	.043	.068	.953	.001	1.229	2.890	1.217
*E-I * S-N * J-P*	.433	.393	.003	.000	.005	2.539	.129
*.E-I * T-F * J-P*	1.250	.288	.278	1.568	.114	2.443	2.756
*S-N * T-F * J-P*	.001	.059	.092	.214	**4.018***	**8.837****	2.420
*E-I * S-N * T-F * J-P*	3.367	.455	.054	.566	.517	**3.871***	**5.013***

** Significant at the 0.01 level * Significant at the 0.05 level

The most notable differences occur on the E-I scale with statistically significant differences on IPIf1, IPIf2, IPIf3 and IPIf6 at the .01 level and IPIf4 and IPIf5 at the .05 level. The S-N scale produced statistically significant differences on IPIf2, IPIf4, IPIf6, and IPIf7 at the .05 level. The only statistically significant differences on the T-F scale were revealed on IPIf5 at the .01 level. Statistically significant differences for IPIf6 and IPIf7 were noted on the J-P scale at the .05 and .01 levels. Statistically significant differences resulting from interaction were limited: E-I * S-N (IPIf3), S-N * T-F (IPIf6), S-N * J-P (IPIf6), T-F * J-P (IPIf6), S-N * T-F * J-P (IPIf5 and IPIf6), and E-I * S-N * T-F * J-P (IPIf6 and IPIf7).

Canonical Correlation. Analysis of the primary research question came full circle with the completion of one final canonical correlation, using continuous quantitative data from the four MBTI scales and the seven factors of Modified IPI (Appendix Q). Once again, the overall IPI total was eliminated as a dependent variable. All 426 cases were included. Zero cases were rejected. The SPSS output produced contained all relevant tables, including the Eigenvalues and Canonical Correlations as well as the Dimension Reduction Analysis.

To determine whether the canonical model sufficiently captures the relationship between the predictor and criterion variable sets, Sherry and Henson (2005) recommend evaluating the full canonical model. The analysis of variance table provides alternative statistical significance tests: Pillai's Trace, Hotelling's Trace, Wilks' Lambda, and Roy's Largest Root. Like other multivariate methods, the most commonly used is Wilk's Lambda. According the Sherry and Henson (2005, p. 42), "these test statistics are for the full model, which means they evaluate the shared variance between the predictor and criterion variables across all of the canonical functions." With a Wilk's Lambda of .72064, F (28, 1497) = 5.088, $p < .001$, the full model was statistically significant.

To evaluate each canonical function, attention focused on the table with Eigenvalues and Canonical Correlations. Sherry and Henson (2005) note the number of canonical functions (i.e., roots, variates, dimensions) is equivalent to the number variables in the smaller set which in this case is four (the predictor set). The number of significant functions may be even smaller. Table 23 details the Eigenvalues and Canonical Correlations. Root equates to function.

Table 23 *Eigenvalues and Canonical Correlations*

Root	Eigenvalue	%	Cum. %	Canon Cor.	Sq. Cor.
1	.23606	66.49093	66.49093	.43701	.19098
2	.06915	19.47846	85.96939	.25433	.06468
3	.04511	12.70633	98.67572	.20776	.04316
4	.00470	1.32428	100.00000	.06841	.00468

Sherry and Henson (2005) clarify the first function was created to maximize the Pearson r (canonical correlation) between two synthetic variables. The remaining variance in the observed variables is used to create the second function, maximizing another Pearson r (the second canonical correlation) between two other synthetic variables which are perfectly uncorrelated with preceding variables (Sherry & Henson, 2005). This continued until four functions (roots) were spawned. As usual in multivariate statistics, the first move accounts for the greatest proportion of the variance and subsequent extractions account for progressively less of the variance. The first two canonical pairs account for 85.97% of the total variance shared by all the root pairs. Together, the first three roots account for 98.68% of the total variance with the fourth accounting for less than 2% of variance.

Assumptions regarding multivariate normality were met, and four pairs of variates (functions) were generated. A review of the Dimension Reduction Analysis exposes that the first three roots were significant, with Wilks' Lambdas: .72064, $F(28, 1498) = 5.09$, $p < .001$; .89076,

F(18, 1177) = 2.73, p < .001; and .95236, *F*(10, 834) = 2.06, p = .025, respectively. This indicates that the first three roots are statistically significant and confirms a noteworthy relationship between the two sets of variables.

The proportion of variance in dependent variables explained by canonical variables was provided: Canonical Variable 1 (34.68%), Canonical Variable 2 (20.66%), and Canonical Variable 3 (5.38%). The proportion of variance in covariates (independent variables) explained by canonical variables was also reported: Canonical Variable 1 (38.99%), Canonical Variable 2 (24.41%), and Canonical Variable 3 (20.29%). Table 24 provides an overview of the factor analysis with t-Values and level of significance.

Table 24	*Canonical Correlation t-Values (Significance) - 426 cases*			
	E-I	**S-N**	**T-F**	**J-P**
IPIf1	-4.28814 (**.000**)	2.64187 (**.009**)	1.82861 (.068)	-1.36103 (.174)
IPIf2	-3.87929 (**.000**)	2.69830 (**.007**)	4.32059 (**.000**)	-2.32079 (**.021**)
IPIf3	-4.76246 (**.000**)	2.56038 (**.011**)	1.52727 (.127)	-1.43468 (.152)
IPIf4	-3.35889 (**.001**)	2.09377 (**.037**)	2.07026 (**.039**)	-.86452 (.388)
IPIf5	-3.06515 (**.002**)	2.22956 (**.026**)	1.56621 (.118)	-.46674 (.641)
IPIf6	-5.88520 (**.000**)	1.35891 (.175)	1.93722 (.053)	-.62204 (.534)
IPIf7	.91910 (.359)	3.74953 (**.000**)	.21511 (.830)	2.27511 (**.023**)

The null hypothesis (H_0 = There is no relationship between the MBTI and the Modified IPI) was rejected. The alternative hypothesis is the best statement reflecting the data. Psychological type, as measured by the Myers-Briggs Type Indicator (MBTI), serves as a predictor of instructional perspectives, as measured by the Modified Instructional Perspectives Inventory (Modified-IPI).

Subsequent Research Questions

The original research design included the following subsequent research questions:

1. What are the reported MBTI types among college faculty across academic disciplines? a. What differences emerge in the reported MBTI types among college faculty teaching in different academic disciplines? b. What differences emerge in the reported MBTI types among college faculty teaching within the same academic discipline?
2. What are the instructional perspectives of college faculty across academic disciplines? a. What differences emerge in the instructional perspectives among college faculty teaching in different academic disciplines? b. What differences emerge in the instructional perspectives among college faculty teaching within the same academic discipline?
3. What are the differences in training and preparation (major, graduate concentration, degree, level and sources of exposure to instructional strategies) among college faculty teaching within the same academic discipline?
4. Are there variations in instructional perspectives among faculty members of similar MBTI types, teaching in the same academic disciplines, related to exposure to adult learning theories, methods, and/or instructional strategies?

Reported MBTI Types among College Faculty across Academic Disciplines. What are the reported MBTI types among college faculty across academic disciplines? 1a) What differences emerge in the reported MBTI types among college faculty teaching in different disciplines? 1b) What differences emerge in the reported MBTI types among college faculty teaching within the same academic discipline? While the initial research design focused the investigation both across and within specific academic disciplines, it also called for exploration

from a campus view. A variety a statistical tools were used to investigate possible patterns. Basic frequencies and descriptive statistics provided a glimpse of MBTI temperaments and types at the campus level as well as a closer look across and within instructional disciplines. Table 25 details the percent of MBTI temperaments and types at each campus.

Table 25	*MBTI Temperaments & Types at each UM Campus*			
Temperament	**MST**	**UMC**	**UMKC**	**UMSL**
iNtuitive-Thinker (NT)	45.3%	38.4%	37.5%	33.3%
iNtuitive-Feeler (NF)	24.5%	24.2%	30.8%	34.9%
Sensation-Judger (SJ)	22.6%	28.9%	23.3%	28.6%
Sensation-Perceiver (SP)	7.5%	8.4%	8.3%	3.2%
MBTI Type	**MST**	**UMC**	**UMKC**	**UMSL**
ENTJ	11.3%	8.4%	12.5%	4.8%
INTJ	18.9%	12.6%	14.2%	12.7%
INTP	9.4%	9.5%	6.7%	7.9%
ENTP	5.7%	7.9%	4.2%	7.9%
ENFP	5.7%	8.4%	8.3%	14.3%
INFP	7.5%	4.2%	5.0%	7.9%
INFJ	7.5%	7.9%	9.2%	7.9%
ENFJ	3.8%	3.7%	8.3%	4.8%
ESFJ	---	1.6%	2.5%	---
ISFJ	3.8%	4.2%	3.3%	3.2%
ISTJ	9.4%	15.3%	14.2%	15.9%
ESTJ	9.4%	7.9%	3.3%	9.5%
ESTP	---	1.6%	3.3%	1.6%
ISTP	5.7%	4.7%	3.3%	---
ISFP	1.9%	1.6%	.8%	1.6%
ESFP	---	.5%	.8%	---

A review of Table 25 reveals that the patterns across the four UM campuses are similar. On three of the four campuses, iNtuitive-Thinkers emerged as the largest group of respondents: MST (45.3%), UMC (38.4%), and UMKC (37.5%). At UMSL, iNtuitive-Feelers (34.9%) slightly outnumbered iNtuitive-Thinkers (33.3%). Sensation-Perceivers made up the smallest percent on each of the campuses: MST (7.5%), UMC (8.4%), UMKC (8.3%), and UMSL (3.2%). Three of the sixteen MBTI types were missing representatives on two campuses: MST (ESFJ, ESFP, & ESTP) and UMSL (ESFJ, ESFP, & ISTP). ESFJs were not found on either campus.

Respondents at each of the campuses were queried on academic disciplines at differing levels: academic discipline in which one teaches (instructional discipline), academic discipline in which one specialized at the graduate level (graduate concentration), undergraduate major, and undergraduate minor. This particular set of subsequent research questions centered on instructional disciplines. As stated earlier, 9.62% of respondents reported teaching in more than one discipline. In response, this variable was treated in two distinct ways:

1. One variable with 11 categories: No Response, Business & Industry, Communication & Fine Arts, Education, Engineering, Humanities, Mathematics & Computer Science, Medical Sciences, Natural Sciences, Social Sciences, and Multiple Disciplines. All respondents noting more than one discipline were place in the final category.
2. Ten separate dichotomous variables - coded as 0 (Not Selected) and 1 (Selected): Business & Industry (ID1), Communication & Fine Arts (ID2), Education (ID3), Engineering (ID4), Humanities (ID5), Mathematics & Computer Science (ID6), Medical Sciences (ID7), Natural Sciences (ID8), Social Sciences (ID9), and Multiple Disciplines (IDM). When respondents selected more than one discipline, those specific disciplines as well as “Multiple Disciplines” were coded as “selected”.

This method of handling data allowed for analysis across the disciplines (one variable with 11 categories) as well as within the different disciplines (ten separate variables).

The next set of frequencies provided a snapshot of the proportion of MBTI temperaments and whole types across instructional disciplines: Business & Industry (ID1), Communication & Fine Arts (ID2), Education (ID3), Engineering (ID4), Humanities (ID5), Mathematics & Computer Science (ID6), Medical Sciences (ID7), Natural Sciences (ID8), Social Sciences (ID9), and Multiple Disciplines (IDM). Table 26 presents a look at MBTI temperaments and types across the instructional disciplines.

Table 26	*MBTI Temperaments & Types across Instructional Disciplines*									
Temperament	**ID1**	**ID2**	**ID3**	**ID4**	**ID5**	**ID6**	**ID7**	**ID8**	**ID9**	**IDM**
NT (163)	7.4%	8.6%	7.4%	5.5%	11.7%	6.1%	13.5%	15.3%	14.1%	8.6%
NF (118)	4.2%	13.6%	15.3%	2.5%	10.2%	2.5%	16.9%	5.1%	16.9%	11.9%
SJ (113)	11.5%	6.2%	8.8%	10.6%	3.5%	2.7%	18.6%	9.7%	19.5%	8.8%
SP (32)	---	9.4%	12.5 %	3.1%	---	3.1%	21.9%	21.9%	18.7%	9.4%
MBTI Type	**ID1**	**ID2**	**ID3**	**ID4**	**ID5**	**ID6**	**ID7**	**ID8**	**ID9**	**IDM**
INTJ (59)	6.8%	8.5%	10.2%	6.8%	11.9%	8.5%	11.9%	15.2%	10.2%	10.2%
ENTJ (40)	12.5%	5.0%	---	7.5%	15.0%	2.5%	12.5%	15.0%	22.5%	2.5%
INTP (36)	5.6%	13.9%	13.9%	5.6%	8.3%	5.6%	11.1%	13.9%	11.1%	8.3%
ENTP (28)	3.6%	7.1%	3.6%	---	10.7%	7.1%	21.4%	17.9%	14.3%	14.3%
ENFP (38)	7.9%	15.8%	18.4%	---	10.5%	---	13.2%	2.6%	18.4%	13.2%
INFJ (35)	2.9%	14.3%	8.6%	5.7%	5.7%	---	20.0%	11.4%	17.1%	11.4%
INFP (23)	---	8.7%	13.0%	4.4%	8.7%	13.0%	26.1%	4.4%	13.0%	8.7%
ENFJ (22)	4.5%	13.6%	22.7%	---	18.2%	---	9.1%	---	18.2%	13.6%
ISTJ (61)	11.5%	4.9%	9.8%	11.5%	4.9%	3.3%	18.0%	9.8%	18.0%	8.2%
ESTJ (30)	13.3%	10.0%	13.3%	13.3%	---	---	23.3%	6.7%	16.7%	3.3%
ISFJ (16)	12.5%	---	---	---	6.3%	6.3%	12.5%	12.5%	25.0%	25.0%
ESFJ (6)	---	16.7%	---	16.7%	---	---	16.7%	16.7%	33.3%	---
ISTP(16)	---	6.2%	18.8%	6.2%	---	---	12.5%	31.3%	18.8%	6.2%
ESTP(8)	---	12.5%	---	---	---	---	37.5%	12.5%	25.0%	12.5%
ISFP(6)	---	16.7%	16.7%	---	---	16.7%	16.7%	16.7%	16.7%	---
ESFP (2)	---	---	---	---	---	---	50%	---	---	50%

Three of the four respondents who chose not to disclose instructional discipline were iNtuitive-Thinkers. NTs are considered the most independent of all types. The greatest percent of iNtuitive-Thinkers teach courses in Natural Sciences (15.3%), Social Sciences (14.1%), and Medical Sciences (13.5%). Each MBTI temperament is comprised of four types. The iNtuitive-Thinking temperament includes INTJs (36%), ENTJs (25%), INTPs (22%), and ENTPs (17%). INTJs were somewhat evenly dispersed across the disciplines with a slightly higher percentage teaching in Natural Sciences (15.2%) and the fewest in Business & Industry (6.8%) and Engineering (6.8%). The largest concentration of ENTJs was found teaching in Social Sciences (22.5%), Natural Sciences (15.0%), and Humanities (15.0%). It was somewhat surprising that none were teaching in Education. Like the INTJs, the INTPs were fairly disseminated across the disciples with the lowest percent (5.6%) in Business & Industry, Engineering, and Mathematics & Computer Science and the highest percent (13.9%) in Natural Sciences and Education. ENTPs were drawn to the sciences: Medical Sciences (21.4%), Natural Sciences (17.9%), Social Sciences (14.3%), as well as Multiple Disciplines (14.3%). It is important to note that there were no ENTPs teaching in Engineering.

Only one iNtuitive-Feeler elected not to disclose instructional discipline. Skilled in diplomacy, the largest assemblies of iNtuitive-Feelers were found in Medical Sciences (16.9%), Social Sciences (16.9%), and Education (15.3%). The iNtuitive-Feeling temperament includes ENFPs (32%), INFJs (30%), INFPs (19.4%), and ENFJs (18.6%). The highest clusters of ENFPs were discovered in Education (18.4%) and Social Sciences (18.4%) and none in Engineering or Mathematics & Computer Science. The largest bands of INFJs teach in Medical Sciences (20%), Social Sciences (17.1%), and Communication & Fine Arts (14.3%) with none in Mathematics & Computer Science. There were no INFPs represented in Business & Industry. The most sizable group of INFPs teaches in Medical Sciences. While there were no ENTJs in

Education, this same discipline drew the highest concentration of ENFJs (22.7%). Like ENFPs and INFJs, there were no ENFJs in Mathematics & Computer Sciences, nor were they found in Engineering or Natural Sciences.

Dubbed the stabilizers of society, all of the Sensation-Judgers dutifully noted instructional discipline. Across the disciplines, the highest concentrations of Sensation-Judgers were in Social Sciences (19.5%) and Medical Sciences (18.6%). The Sensation-Judger temperament is comprised of ISTJs (54%), ESTJ (27%), ISFJs (14%), and ESFJs (5%). Surprisingly, ISTJs were discovered teaching in every discipline with the largest percent (18%) in both Medical Sciences and Social Sciences. ESTJs were drawn to these same disciplines with even greater numbers in Medical Sciences (23.3%). Humanities and Mathematics & Computer Science held very slight representations of ISTJs and ISFJs; however there were no ESTJs or ESFJs in either discipline. In fact, ESFJs were missing from Business & Industry and Education as well. Fifty percent of the ISFJs were split between Social Sciences and teaching in multiple disciplines, while none were located in Communication & Fine Arts, Education, or Engineering.

Sensation-Perceivers are often described as tactical risk takers. These kinesthetic learners are most at risk dropping or stopping out in their education and precious few (7.5%) were represented in this research. Those who persisted were largely found teaching in the sciences: Medical Sciences (21.9%), Natural Sciences (21.9%), and Social Sciences (18.7%). None were found in Business & Industry or Humanities and only one Sensation-Perceiver was located in each of the following disciplines: Engineering (ISTP) and Mathematics & Computer Science (ISFP). Three were found teaching in Communication & Fine Arts: ISTP (1), ESTP (1), and ISFP (1). Education drew only four SPs and all were introverted: ISTP (3) and ISFP (1). Only two ESFPs participated in the study: one teaches in Medical Sciences and the other across multiple disciplines.

The final set of frequencies was run for each individual discipline: Business & Industry (ID1), Communication & Fine Arts (ID2), Education (ID3), Engineering (ID4), Humanities (ID5), Mathematics & Computer Science (ID6), Medical Sciences (ID7), Natural Sciences (ID8), Social Sciences (ID9), and Multiple Disciplines (IDM). Table 27 provides a detailed look at MBTI temperaments and types within each discipline.

Table 27	*MBTI Temperaments & Types within each Instructional Discipline*									
Temperament	**ID1**	**ID2**	**ID3**	**ID4**	**ID5**	**ID6**	**ID7**	**ID8**	**ID9**	**IDM**
NT	39%	31.3%	27.6%	41.9%	51.1%	52.4%	32.9%	46.7%	31.8%	34.1%
NF	22%	41.7%	43.1%	12.9%	31.1%	14.3%	28.9%	15.0%	30.7%	34.1%
SJ	39%	20.8%	20.7%	38.7%	17.8%	23.8%	28.9%	21.7%	30.7%	24.4%
SP	---	6.3%	8.6%	6.5%	---	9.5%	9.2%	16.7%	6.8%	7.3%
MBTI Type	**ID1**	**ID2**	**ID3**	**ID4**	**ID5**	**ID6**	**ID7**	**ID8**	**ID9**	**IDM**
ENTJ	12.2%	4.2%	---	12.9%	13.3%	4.8%	6.6%	11.7%	10.2%	2.4%
INTJ	12.2%	12.5%	13.8%	16.1%	22.2%	28.6%	10.5%	16.7%	8.0%	14.6%
INTP	12.2%	10.4%	8.6%	9.7%	6.7%	9.5%	6.6%	8.3%	6.8%	7.3%
ENTP	2.4%	4.2%	5.2%	3.2%	8.9%	9.5%	9.2%	10.0%	6.8%	9.8%
ENFP	12.2%	14.6%	19.0%	---	8.9%	---	7.9%	3.3%	11.4%	12.2%
INFP	---	4.2%	6.9%	3.2%	4.4%	14.3%	9.2%	3.3%	4.5%	4.9%
INFJ	7.3%	16.7%	5.2%	9.7%	6.7%	---	9.2%	8.3%	6.8%	9.8%
ENFJ	2.4%	6.3%	12.1%	---	11.1%	---	2.6%	---	8.0%	7.3%
ESFJ	---	2.1%	---	3.2%	---	---	1.3%	1.7%	2.3%	---
ISFJ	7.3%	2.1%	1.7%	---	4.4%	4.8%	3.9%	5.0%	6.8%	9.8%
ISTJ	19.5%	10.4%	12.1%	22.6%	13.3%	19.0%	14.5%	11.7%	14.8%	12.2%
ESTJ	12.2%	6.3%	6.9%	12.9%	---	---	9.2%	3.3%	6.8%	2.4%
ESTP	---	2.1%	1.7%	---	---	---	3.9%	3.3%	2.3%	2.4%
ISTP	---	2.1%	5.2%	6.5%	---	---	2.6%	10.0%	3.4%	2.4%
ISFP	---	2.1%	1.7%	---	---	4.8%	1.3%	1.7%	1.1%	---
ESFP	---	---	---	---	---	4.8%	1.3%	1.7%	---	2.4%

Within Business & Industry (ID1), an equivalent percent of iNtuitive-Thinkers (39%) and Sensation-Judgers (39%) were found. There were fewer iNtuitive-Feelers (22%) and no Sensation-Perceivers. A closer look at the breakdown of the sixteen MBTI types shows that ISTJs (19.5%) dominate Business & Industry while there is an even dispersion of ENTJs, INTJs, INTPs, ENFPs, and ESTJs at 12.2% each. Not only are all four Sensation-Perceiver types missing from the ranks, INFPs and ESFJs are as well.

A look into Communication &Fine Arts (ID2) presents another story. A solid 41.7% of the instruction comes from iNtuitive-Feeler with INFJs (16.7%), ENFPs (14.6%), and INTJs (12.5%) taking the lead. There is a sparse showing of Sensation-Perceivers with ESTPs, ISTPs, and ISFPs disseminated across the discipline at a rate of 2.1 percent. The remainder of the instruction comes through iNtuitive-Thinkers (31.3%) and Sensation-Judgers (20.8%).

Nearly one-fifth of the instructors in Education (ID3) are ENFPs. Like other iNtuitive-Feelers, they are passionate about personal growth and development and often play a key role in helping others realize their potential. In fact, 43.1 percent of the faculty representing Education were NFs with NTs (27.6%), SJs (20.7%), and SPs (8.6%) shoring up the gap. Of the sixteen types, INTJs (13.8%), ENFJ's (12.1%), and ISTJs (12.1%) followed ENFPs (19.0%) in carrying the heaviest loads. Oddly enough, many extraverted cohorts were missing from the educational mix, including ENTJs, ESFJs, and ESFPs.

Like Business & Industry, Engineering (ID4) is dominated by iNtuitive-Thinkers (41.9%) and Sensation-Judgers (38.7%). This discipline does attract iNtuitive-Feelers (12.9%) as well as Sensation-Perceivers (6.5%) on a much smaller scale. A deeper look into Engineering reveals a fair distribution of ISTJs (22.6%), INTJs (16.1%1), ENTJs (12.9%), and ESTJs (12.9%). Missing, however, are the Extraverted Feelers and Perceivers: ENFPs, ENFJs, ESFPs, and ESTPs as well as ISFJs and ISFPs.

As the number of students choosing majors in the Humanities (ID5) continues to decline, 51.1% of faculty in this discipline were iNtuitive-Thinkers. This instructional discipline is also represented by iNtuitive-Feelers (31.1%) who look for patterns in people over time and Sensation-Judgers (17.8%) who work to preserve tradition. The impulsive, risk-taking Sensation-Perceivers, however, may not see any practical value in Humanities as none are found to represent this discipline nor did we find any ESFJs or ESTJs. The bulk of instruction in this discipline comes through INTJs (22.2%), ENTJs (13.3%), and ISTJs (13.3%).

Like Humanities, a similar share of instruction in Mathematics & Computer Science (ID6) comes through iNuitive-Thinkers (52.4%). Sensation-Judgers (23.8%) comprise the second largest group, followed by iNutive-Feelers (14.3%) and Sensation-Perceivers (9.5%). Comparable to Engineering, a number of Extraverted Feelers and Perceivers are missing: ENFPs, ENFJs, ESFJs, and ESTPs as well as ESTJs, INFJs, and ISTPs.

As an instructional discipline, the Medical Sciences (ID7) attract those who value knowledge, science, and technology (iNtuitive-Thinkers - 32.9%), those who desire to serve and protect humanity (iNtuitive-Feelers – 28.9%), those who want the security of a more traditional field with plentiful job opportunities (Sensation-Judgers – 28.9%), and those who want an education that provides practical hands-on training (Sensation-Perceivers - 9.2%). This was the only instruction discipline within which all sixteen types were represented.

Similar to the Medical Sciences, the Natural Sciences (ID8) drew solid representation from iNtuive-Thinkers (46.7%), Sensation-Judgers (21.7%), Sensation-Perceivers (16.7%), and iNtuitive-Feelers (15%). Fifteen of the sixteen individual MBTI types were found in Natural Sciences with the sole exclusion of ENFJs. The bulk of instruction is delivered through INTJs (16.7%), ENTJs (11.7%), ISTJs (11.7%), ENTPs (10%), and ISTPs (10%). This ten percent marked the largest representation of Sensation-Perceivers in any one discipline.

Social Sciences (ID9) provided the most equivalent dispersion of iNtuitive-Thinkers (31.8%), iNtuitive-Feelers (30.7%), and Sensation-Judgers (30.7%). Even the Sensation-Perceivers (6.8%) found representation in this discipline. Like the Natural Sciences, Social Sciences had at least one representative from fifteen of the sixteen MBTI types with omission of ESFPs. An interesting difference is that the three highest percents were delivered through three separate temperaments: ISTJs (14.8%), ENFPs (11.4%), and ENTJs (10.2%)

Faculty members provide instruction in multiple disciplines for a variety of reasons. Some have a breadth of interests with the depth necessary to teach. Some hold a definite preference for multidisciplinary approaches. And some are trying to scrap out a living by patching together enough courses as adjuncts to meet their needs. Whatever the reason, they could easily be considered a breed all their own. As anticipated, 68.2% of faculty teaching in multiple disciplines are iNtuitives, with an even split between iNtuitive-Thinkers (34.1%) and iNtuitive-Feelers (34.1%). After all iNtuitives have an insatiable desire for knowledge and information on a variety of subjects. They prefer to read; they prefer to learn; and they are energized by sharing their pursuits with others. They both conceptualize and epitomize lifelong learning. Perceivers are also known to enjoy variety as it often breaks up dull routines. It was curious to discover that 12.2% were ISTJs and 9.8% were ISFJs. Introverts usually prefer depth over breadth and Sensors normally prefer a more detailed, practical approach. Sensation-Judgers are stabilizers who value security and the preservation of tradition.

ANOVAs and MANOVAs. ANOVAs and MANOVAs are multivariable techniques which test the significance of group differences. Drawing from the one independent variable (Instructional Discipline) with eleven categories, a series of four ANOVAs were conducted against each of the four MBTI continuous scales to assess whether any statistically significant group differences emerged across the instructional disciplines. Levene's test for homogeneity of

variance reported the following statistics and level of significance: E-I .840 (.590), S-N 2.813 (.002), T-F 1.346 (.204), and J-P 1.326 (.214). With significance values greater than .05, ANOVAs for the E-I, T-F, and J-P scales did not violate the assumption of homogeneity of variance; however, the S-N (.002) did violate this assumption. Results produced for Robust Tests of Equality of Means showed Welch at 2.631, (10, 72) *df*, p = .009 and Brown-Forsythe at 2.067, (10, 292) *df*, p = .027. A comparison of between-groups means reported:

- Extraversion-Introversion – $F(10, 415)=1.10$, p = .358,
- Sensation-iNtuition – $F(10, 415)=1.89$, p = .045,
- Thinking-Feeling - $F(10, 415)=3.11$, p = .001, and
- Judgement-Perception - $F(10, 415)=1.04$, p = .411.

Significant differences ($p < .05$) emerged on the S-N and T-F scales. Yielding a closer inspection of group differences within the instructional disciplines, a factorial MANOVA was conducted. The ten independent variables, known as Instructional Disciplines, were run against the four continuous MBTI scales as dependent variables. Box's Test of Equality of Covariance produced a significance value of .142, indicating that the assumption has not been violated. The value of Wilks' Lambda and its associated significance level for each discipline is as follows:

- Business & Industry – Wilks' $\Lambda=.990$, $F(4, 412) = 1.03$ p = .394,
- Communication & Fine Arts - Wilks' $\Lambda=.991$, $F(4, 412)=.89$, p = .471,
- Education - Wilks' $\Lambda=.989$, $F(4, 412)=1.09$ p = .359,
- Engineering - Wilks' $\Lambda=.983$, $F(4, 412)=1.74$ p = .141,
- Humanities - Wilks' $\Lambda=.998$, $F(4, 412)=.24$ p = .913,
- Mathematics & Computer Science - Wilks' $\Lambda=.997$, $F(4, 412)=.33$ p = .858,
- Medical Sciences - Wilks' $\Lambda=.988$, $F(4, 412)=1.24$ p = .294,
- Natural Sciences - Wilks' $\Lambda=.986$, $F(4, 412)=1.45$ p = .218,

- Social Sciences - Wilks' Λ=.993, $F(4, 412)$=1.03 p = .69, and
- Multiple Disciplines - Wilks' Λ=.995, $F(4, 412)$=.52 p = .721.

Values exceeded .05; there are no statistically significant differences between the groups.

Levene's test for homogeneity of variance reported the following statistics and level of significance: E-I .913 (.596), S-N 1.625 (.025), T-F .932 (.568), and J-P 1.187 (.237). With significance values greater than .05, ANOVAs for the E-I, T-F, and J-P scales equal variances are assumed; however, the S-N once again violated this assumption, leading to the establishment of a more conservative alpha. The new alpha was set using the Bonferroni adjustment (.05/4 dependent variables; α=.0125). Results at $p < .0125$ were considered significant. Table 28 provides F-Values and level of significance for the Tests of Between-Subject Effects.

Table 28	*Factorial MANOVA: Tests of Between-Subject Effects*			
	E-I Scale	**S-N Scale**	**T-F Scale**	**J-P Scale**
Business & Industry	.262 (.609)	2.027 (.155)	.390 (.532)	.211 (.647)
Communication & Fine Arts	.123 (726)	.077 (.782)	1.350 (.246)	1.359 (.244)
Education	1.786 (.182)	.312 (.577)	.068 (.794)	1.260 (.262)
Engineering	.015 (.903)	2.554 (.111)	4.806 (.029)	.000 (1.000)
Humanities	.555 (.457)	.065 (.799)	.066 (.797)	.127 (.721)
Math & Computer Science	.471 (.493)	.123 (.726)	.445 (.505)	.118 (.732)
Medical Sciences	.561 (.454)	1.414 (.235)	.003 (.958)	.943 (.332)
Natural Sciences	.024 (.878)	.908 (.341)	1.375 (.242)	1.519 (.218)
Social Sciences	1.008 (.316)	.322 (.571)	.014 (.907)	.660 (.417)
Multiple Disciplines Selected	.140 (.708)	1.097 (.295)	.714 (.398)	.001 (.970)

As each dependent variable was considered in light of each instructional discipline, results were insignificant. There were no statistically significant differences between the groups.

Logistic Regression. The majority of the multivariate techniques, including ANOVAs and MANOVAs, require the use of continuous (quantitative) dependent variable(s). Logistic regression allows greater flexibility. Pallant (2006) reports "logistic regression allows the researcher to test models to predict categorical outcomes with two or more categories" (p. 160). Logistic regression can be completed with two or more categorical or continuous independent variables (MBTI scales) run against one dependent variable with two or more categories (instructional disciplines) for the purpose of group prediction. As discussed earlier, the variable known as instructional discipline was handled in two distinct ways and logistic regression seemingly allowed for either method. The four MBTI continuous scales were run as independent variables against each separate instructional discipline dummy coded as a dichotomous dependent variable for the purpose of group prediction within an instructional discipline. With ten individual dependent variables, this effort produced ten sets of analysis. According to the case processing summary, all 426 cases were included in each analysis. Dependent variables were encoded 0 – Not Selected and 1 – Selected. Block 0 provides results of the analysis without any of the independent variables used in the model. This serves as baseline for comparing the model once the predictor variables have been added in. Results from the model being tested with predictor variables are then found in Block 1.

Referred to as a 'goodness of fit' test, the Omnibus Tests of Model Coefficients provides an overall indication of how well the model performs (Pallant, 2006). A significant value less than .05 is desired. With four degrees of freedom, results from the Omnibus tests (Chi-square value w/Significance) are mixed: Business & Industry 1.560 (.816), Communication & Fine Arts 11.337 (.023), Education 6.554 (.161), Engineering 13.949 (.007), Humanities 4.312 (.365), Mathematics & Computer Science 6.891 (.142), Medical Sciences 4.235 (.375), Natural Sciences 10.901 (.028), Social Sciences 3.176 (.529), and Multiple disciplines 3.011 (.556). Only two

seemed to warrant a closer look: Communication & Fine Arts and Engineering. Pallant (2006) stresses that the Hosmer and Lemeshow test is considered the most reliable test of model fit available in SPSS. For this test, a value greater than .05 is favorable. With eight degrees of freedom, results from the Hosmer and Lemeshow tests (Chi-square value w/Significance) demonstrated that each model was worthwhile: Business & Industry 6.239 (.621), Communication & Fine Arts 3.269 (.916), Education 11.269 (.187), Engineering 2.612 (.956), Humanities 8.276 (.407), Mathematics & Computer Science 5.309 (.724), Medical Sciences 4.061 (.852), Natural Sciences 4.252 (.834), Social Sciences 3.961 (.861), and Multiple disciplines 4.087 (.849). Pallant (2006) reports "Cox & Snell R Square and the Nagelkerke R Square values provide an indication of the amount of variation in the dependent variable explained by the model (from a minimum value of 0 to a maximum of approximately 1)" (p. 167). Rather than true R square values, Pallant (2006) describes these values as pseudo R square statistics. Mertler and Vannatta (2005) report "Cox & Snell - R^2 and the Nagelkerke R^2 represent two different estimates in the amount of variance in the DV accounted for by the model" (p. 319). Cox & Snell - R^2 and the Nagelkerke R^2 are reported for each discipline, respectively: Business & Industry - .004 and .008, Communication & Fine Arts - .026 and .052, Education - .015 and .028, Engineering - .032 and .079, Humanities - .010 and .021, Mathematics & Computer Science - .016 and .049, Medical Sciences - .010 and .016, Natural Sciences- .025 and .045, Social Sciences - .007 and .012, and Multiple disciplines - .007 and .015. The highest values reported came from Communication & Fine Arts (.052) and Engineering (.079), however, this means less than 8% of the variation in Engineering and less than 6% of the variation in Communication & Fine Arts is explained by the four MBTI scales. Across the remaining instructional disciplines, less than 5% of the variation is explained by this set of variables.

The percentage reported in the classification table for Block 1 are as follows: Business & Industry (90.4%), Communication & Fine Arts (88.7%), Education (86.4%), Engineering (92.7%), Humanities (89.4%), Mathematics & Computer Science (95.1%), Medical Sciences (82.2%), Natural Sciences (85.9%), Social Sciences (79.3%), and Multiple disciplines (90.4%). A comparison of the percents reported in classification table for Block 0 reveals identical figures in both tables across the logistic regressions. There was no improvement once the predictor variables were included in the model.

The Wald test in Variables in the Equation table sheds light on the contribution or importance of each predictor variable (Pallant, 2006). Table 29 presents an overview of the statistics produced by the Wald test with corresponding levels of significance.

Table 29	*Logistic Regression: Wald, 1df, Significance*			
	E-I	**S-N**	**T-F**	**J-P**
Business & Industry	.050 (.823)	1.404 (.236)	.001 (.971)	.074 (.786)
Communication & Fine Arts	.822 (.365)	.070 (.791)	**9.238 (.002)**	.025 (.876)
Education	3.153 (.076)	.018 (.894)	1.506 (.220)	.308 (.579)
Engineering	.173 (.677)	.032 (.858)	**9.494 (.002)**	.019 (.890)
Humanities	.204 (.651)	2.873 (.090)	.116 (.734)	2.203 (.138)
Math & Computer Science	**4.421 (.036)**	1.666 (.197)	.782 (3.77)	.355 (.551)
Medical Sciences	.085 (.771)	3.613 (.057)	1.119 (.290)	.932 (.334)
Natural Sciences	1.344 (.246)	.212 (.645)	**5.610 (.018)**	**4.326 (.038)**
Social Sciences	1.864 (.172)	.403 (.526)	.328 (.567)	.203 (.653)
Multiple Disciplines	.072 (.789)	.027 (.870)	.204 (.494)	1.569 (.210)

Out of ten logistic regressions and 40 statistics, only five contributed to the predictive ability of the model at the .05 level:

- Communication & Fine Arts by T-F – B=.590, S.E.=.194, Wald=9.238, p = .002,
- Engineering by T-F – B=-.800, S.E.=.260, Wald=9.494, p = .002,
- Mathematics & Computer Science by E-I – B=.510, S.E.=.243, Wald=4.421, p = .036,
- Natural Sciences by T-F – B=-.431, S.E.=.182, Wald=5.610, p = .018, and
- Natural Sciences by J-P – B=.317, S.E.=.153, Wald=4.326, p = .038.

Of the four MBTI scales, the Thinking-Feeling scale was the most predictive. Still overall the results were insignificant.

Instructional Perspectives of College Faculty across Academic Disciplines. What are the instructional perspectives of college faculty across academic disciplines? What differences emerge in the instructional perspectives among college faculty teaching in different disciplines? What differences emerge in the instructional perspectives among college faculty teaching within the same academic discipline?

ANOVAs. Analysis of variance (ANOVA) was the statistical method chosen to explore differences between the means of the overall IPI score for instructors teaching in the different disciplines as well as those employed by the different campuses (Appendix R). The impact of two demographic variables was considered as well: Teaching status and gender. Levene's test for homogeneity of variances assesses whether the variance in scores is the same for each of the groups. If values from Levene's test are $p>.05$, then the assumption of homogeneity of variance has not been violated (Pallant, 2006). The significance values for Levene's test produced mixed results: Instructional Discipline (.043), Campus (.368), Teaching Status (.020), and Gender (.054). The assumption of homogeneity of variance was not violated in the analysis conducted for the IPI Total by campus and gender as values exceeded .05; however, the figures presented

for instructional discipline and teaching status indicate that the assumption was violated. When the homogeneity of variance is violated, Pallant (2006) recommends consulting the Robust Tests of Equality of Means which present Welch and Brown-Forsythe statistics. Outputs from these tests are reported: Total IPI score by Instructional Discipline – Welch $F(10, 69) = 3.68$, $p = .001$ and Brown-Forsythe $F(10, 20) = 2.76$, $p = .026$ and IPI total by Teaching Status - Welch $F(4, 22) = 4.41$, $p = .009$ and Brown-Forsythe $F(4, 9) = 4.56$, $p = .026$.

The following results were reported in the ANOVA table: Instructional Discipline $F(10, 415) = 3.81$, $p < .001$, Campus $F(3, 422) = 4.73$, $p = .003$, Teaching Status $F(4, 421) = 7.66$, $p < .001$, and Gender $F(1, 424) = 9.82$, $p = .002$. Values demonstrate statistically significant differences between the groups on the IPI total score. Tukey post-hoc tests in the Multiple Comparison table show where the differences occurred. Across the instructional disciplines, there were significant differences in the mean scores produced by Education and three other instructional disciplines: Engineering, Mathematics & Computer Science, and Natural Sciences. The highest mean scores were produced by faculty teaching in Education, Multiple Disciplines, and Communication & Fine Arts. A closer look at mean scores reported on the combined scales of the Modified Instructional Perspectives Inventory (total score) by faculty across instructional disciplines portrays a slightly different story: Education (170), Multiple Disciplines (166), Communication & Fine Arts (165), Humanities (164), Medical Sciences (163), Social Sciences (160), Business & Industry (159), Natural Sciences (155), Mathematics & Computer Science (153), and Engineering (152). Each of the mean scores fell within the average range (149-184) according to the category levels produced by Stanton (2005).

A comparison of mean scores achieved by faculty from the different UM campuses reveal that the most significant differences are between UMSL and two other campuses: MST and UMC. Mean scores fell into the following ranges: MST (112-195), UMC (112-200),

UMKC (103-207), and UMSL (93-213). The lowest and highest total IPI scores were derived by faculty from UMSL. As with instructional disciplines, the mean scores were within the average range: MST (155), UMC (161), UMKC (161), and UMSL (168). With regard to teaching status, significant differences were observed between adjunct instructors and tenured faculty as well as graduate teaching assistants. Mean scores across the categories were as follows: Adjunct Instructors (168.3), Non-Tenured Faculty (162.3), Tenured Faculty (159.6), and Graduate Teaching Assistants (158.6). Finally, significant differences were found between genders: Female (164) and Male (158). The range of minimum and maximum scores showed that Males (93-213) held both the lowest and highest scores. Once again, the mean scores, according to the scale produced by Stanton (2005), were average across each of the variables analyzed.

MANOVAs. Next, a series of MANOVAs was conducted to explore differences between the mean scores on each of the seven IPI factors among faculty groups based on Instructional Discipline, Campus, Teaching Status and Gender (Appendix S). Once again, instructional discipline was viewed as one variable with eleven categories. An inspection of descriptive statistics for each MANOVA showed N values exceeded 30 in all but three cells under Instructional Discipline: No Response (4), Engineering (25), and Mathematics & Computer Science (17). A review of Box's M significance values across the four sets of output showed that three of four violated the assumption of homogeneity of variance-covariance matrices as values fell below .001: Instructional Discipline (.000), Campus (.068), Teaching Status (.000), and Gender (.000). Wilk's Lambda is generally used as the multivariate test of significance; however, Pillai's Trace is used when homogeneity of variance-covariance is in question. The following statistics were reported:

- Instructional Discipline – Pillai's Trace .363, $F(70, 2905) = 2.26$, $p < .001$,
- Campus - Pillai's Trace .097, $F(21, 1254) = 1.99$, $p = .005$,

- Teaching Status - Pillai's Trace .184, $F(28, 1672) = 2.88$, $p < .001$, and
- Gender - Pillai's Trace .032, $F(7, 418) = 1.96$, $p = .059$.

Values for the first three demonstrate statistically significant differences in mean scores between faculty teaching in the different disciplines, faculty teaching on the different campuses, as well as faculty holding different teaching status across the seven IPI factors. Variation between genders was not significant at $p = .059$.

Table 30 provides an overview of the F-values and associated level significance produced for each of the seven IPI factors through Levene's test on the four MANOVAs: Instructional Discipline, Campus, Teaching Status, and Gender.

Table 30	*MANOVAs: F-Values (Significance) for Levene's Test of Equality*			
	Instructional Discipline	**Campus**	**Teaching Status**	**Gender**
IPIf1	2.797 **(.002)***	.018 (.997)	4.083 **(.003)***	.849 (.357)
IPIf2	2.232 **(.015)***	.635 (.593)	5.523 **(.000)***	3.709 (.055)
IPIf3	2.956 **(.001)***	.976 (.404)	6.713 **(.000)***	9.604 **(.002)***
IPIf4	2.506 **(.006)***	.913 (.435)	2.832 **(.024)***	1.543 (.215)
IPIf5	1.441 (.160)	3.483 **(.016)***	2.576 **(.037)***	.152 (.697)
IPIf6	.768 (.659)	.668 (.572)	.920 (.452)	2.514 (.114)
IPIf7	1.786 (.061)	.708 (.548)	3.264 (.012)	5.105 **(.024)***

* The assumption of equality of variance for that variable has been violated.

The assumption of equality of variance was violated more frequently by instructional discipline and teaching status. To reduce the chance of a Type I error, a more conservative alpha level was set using the Bonferroni adjustment (.05/7 dependent variables; $\alpha = .007$). Results will be considered significant only if they fall less than .007.

Table 31 presents a detailed look at F values and significance levels produced through Tests of Between-Subject Effects for each of the MANOVAs.

Table 31	*MANOVAs: Tests of Between-Subject Effects*			
	Instructional Discipline	**Campus**	**Teaching Status**	**Gender**
IPIf1	1.328 (.213)	2.605 (.051)	4.953 **(.001)****	3.766 (.053)
IPIf2	3.364 **(.000)****	5.663 **(.001)****	6.185 **(.000)****	9.682 **(.002)****
IPIf3	2.399 (.009)*	1.753 (.156)	8.832 **(.000)****	4.626 (.032)
IPIf4	3.064 **(.001)****	2.530 (.057)	7.403 **(.000)****	8.699 **(.003)****
IPIf5	1.681 (.083)	4.538 **(.004)****	1.564 (.183)	1.450 (.229)
IPIf6	7.077 **(.000)****	3.428 (.017)	5.529 **(.000)****	8.478 **(.004)****
IPIf7	2.093 (.024)	1.641 (.179)	.700 (.592)	.796 (.373)

* Significant at the 0.01 level ** Significant at the 0.007 level

Differences in the mean scores by faculty teaching in various disciplines were statistically significant at the .007 level for IPIf2, IPIf4, and IPIf6. To determine the size of the effect, Partial Eta Squared values were examined: IPIf1 (.031), IPIf2 (.075), IPIf3 (.055), IPIf4 (.069), IPIf5 (.039), IPIf6 (.146), and IPIf7 (.048). This means that differences in instructional disciplines accounted for 7.5% of the variance in Teacher Trust of Learners (IPIf2), 6.9% of the variance in Accommodating Learner Uniqueness (IPIf4), and 14.6 % of the variance in Learner-Centered Learning Processes (IPIf6). A comparison of group means revealed the two highest means on each scale were achieved by faculty teaching in the following instructional disciplines:

- IPIf1: Teacher Empathy with Learners – Communication & Fine Arts and Education
- IPIf2: Teacher Trust of Learners – Education and Communication & Fine Arts,
- IPIf3: Planning & Delivery of Instruction – Multiple Disciplines and Education,

- IPIf4: Accommodating Learner Uniqueness – Education and Communication & Fine Arts,
- IPIf5: Teacher Insensitivity Toward Learners – Multiple Disciplines and Education,
- IPIf6: Learner-Centered Learning Process – Education and Multiple Disciplines, and
- IPIf7: Teacher-Centered Learning Process – Humanities and Medical Sciences.

This same comparison exposed the instructional disciplines in which faculty logged the lowest mean scores on each of the seven factors:

- IPIf1: Teacher Empathy with Learners – Business & Industry and Engineering,
- IPIf2: Teacher Trust of Learners – Mathematics & Computer Science & Engineering,
- IPIf3: Planning & Delivery of Instruction – Natural Sciences and Mathematics & C.S.,
- IPIf4: Accommodating Learner Uniqueness – Social Sciences and Engineering,
- IPIf5: Teacher Insensitivity Toward Learners – Engineering and Natural Sciences,
- IPIf6: Learner-Centered Learning Process – Engineering and Mathematics & C.S., and
- IPIf7: Teacher-Centered Learning Process – Math & C.S. and Communication & F.A.

A view across institutions illuminated statistically significant differences among faculty teaching at the different campuses on two scales: IPIf2 and IPIf5. Partial Eta Squared values divulge that only 3.9% of variation in Teacher Trust of Learners (IPIf2) and 3.1% of variation in Teacher Insensitivity Toward Learners (IPIf5) is explained by campus. It is interesting to note that with the exception of IPIf7, a repeating pattern did emerge: The highest mean scores across the first six factors were collectively achieved by faculty teaching at the University of Missouri-St. Louis and the lowest by faculty at Missouri University of Science & Technology.

Results began to escalate as teaching status was taken into consideration. Values were statistically significant at the .007 level on IPIf1, IPIf2, IPIf3, IPIf4, and IPIf6. Differences in teaching status accounted for 4.5% of the variance in Teacher Empathy with Learners (IPIf1), 5.6% of the variance in Teacher Trust of Learners (IPIf2), 7.7% of the variance in Planning &

Delivery of Instruction (IPIf3), 6.6% of the variance in Accommodating Learner Uniqueness (IPIf4), and 5% of the variance in Learner-Centered Learning Process (IPIf6). Once again with the exception of IPIf7, a pattern began to unfold: The highest mean scores across the first six factors were collectively achieved by Adjunct Instructors, while the lowest means came from Tenured Faculty and Graduate Teaching Assistants.

Statistically significant differences in mean scores based on Gender occurred at the .007 level for IPIf2, IPIf4, and IPIf6. However, a closer inspection unveiled that gender merely accounted for 2.2% of the variance in Teacher Trust of Learners (IPIf2), 2% of the variance in Accommodating Learner Uniqueness (IPIf4), and 2% of the variance in Learner-Centered Learning Processes (IPIf6).

The MANOVAs demonstrated statistically significant differences between faculty teaching across the disciplines on three scales (IPIf2, IPIf4, and IPIf6), faculty teaching at the different campus on two scales (IPIf2 and IPIf5), faculty holding different teaching status on five scales (IPIf1, IPIf2, IPIf3, IPIf4, and IPIf6), and faculty of different genders on three scales (IPIf2, IPIf4, and IPIf6). A factorial MANOVA was conducted to examine the interaction between these independent variables and their combined impact on the seven IPI factors (Appendix S). The significance value of .361 for Box's M demonstrates that the assumption of homogeneity of variance-covariance matrices was not violated. Reporting of Wilks' Lambda values was limited to reporting only those that proved significant below the .05 value: Teaching Status .828, $F(28, 849)=1.63$, $p = .021$, Instructional Discipline .684, $F(70, 1377)=1.33$, $p = .040$, Gender * Teaching Status .867, $F(21, 675)=1.64$, $p = .037$, Gender * Campus * Teaching Status .766, $F(42, 1106)=1.54$, $p = .016$, and Gender * Campus * Teaching Status * Instructional Discipline .793, $F(35, 991)=1.61$, $p = .015$. Values validate statistically significant differences in mean scores on the seven IPI factors, pointing toward the need for further investigation.

Levene's test reported the following significance values: IPIf1 (.000), IPIf2 (.000), IPIf3 (.000), IPIf4 (.008), IPIf5 (.000), IPIf6 (.026), and IPIf7 (.000). The assumption of equality of variance was violated on five of the IPI factors. To compensate for this issue and reduce the chance of a Type I error, the more conservative alpha (α=.007) was adopted. Results at or below .007 were considered significant. During a review of the Tests of Between-Subjects Effects, a number of results significant at the .05 level drew notice; however, only results at or below the more conservative alpha level of .007 were considered significant: Gender – IPIf1 (.005), Teaching Status * Instructional Discipline – IPIf7 (.007), Gender * Campus * Instructional Discipline – IPIf7 (.001), Gender* Campus * Teaching Status * Instructional Discipline – IPIf1 (.001). Gender accounted for 3.2% of the variance in mean scores on Teacher Empathy with Learners (IPIf1), while 8.1% was explained by the interaction of all four variables: Gender* Campus * Teaching Status * Instructional Discipline. The combined effect of Teaching Status and Instructional Discipline justified 17.4% of the variance in mean scores for Teacher-Centered Learning Process (IPIf7), while 15.2% was attributed to interplay of Gender * Campus * Instructional Discipline.

The previous analysis examined differences in the instructional perspectives among college faculty teaching across the different disciplines by treating Instructional Disciplines as one independent variable with eleven categories. Treating the variable, Instructional Discipline, as ten separate variables allowed for a closer examination of instructional perspectives within each academic discipline. A factorial MANOVA was conducted drawing on Instructional Disciplines as ten separate independent variables and running them against the seven IPI factors as dependent variables. With the exception of Mathematics & Computer Science, the number of subjects in each discipline exceeded 30. Box's M significance value was .000, indicating a violation of the assumption of homogeneity of variance-covariance matrices. Pillai's Trace

values across the instructional disciplines ranged from .010-.039 with the following significance: ID1 (.777), ID2 (.033), ID3 (.021), ID4 (.632), ID5 (.343), ID6 (.074), ID7 (.425), ID8 (.377), ID9 (.495), IDM (.353). This multivariate test of significance revealed that only two warranted a closer look: Communication & Fine Arts (ID2) and Education (ID3).

The assumption of homogeneity of variance has not been violated when significance values on Leven's test exceed .05. Significance values produced through Levene's test exceeded .05: IPIf1 (.156), IPIf2 (.635), IPIf3 (.111), IPIf4 (.609), IPIf5 (.290), IPIf6 (.976), and IPIf7 (.407). The assumption of equality of variance was not violated. This warrants further investigation. Attention was focused on Communication & Fine Arts as well as Education. Table 32 provides results reported by SPSS on the Tests of Between-Subject Effects.

Table 32	*Factorial MANOVAs – Tests of Between-Subjects Effects*	
	Communication & Fine Arts	**Education**
IPIf1	$F(28, 397)=8.37$, p = .004	$F(28, 397)=5.25$, p = .022
IPIf2	$F(28, 397)=5.76$, p = .017	$F(28, 397)=7.47$, p = .007
IPIf3	$F(28, 397)=3.80$, p = .052	$F(28, 397)=6.09$, p = .014
IPIf4	$F(28, 397)=7.23$, p = .007	$F(28, 397)=11.80$, p = .001
IPIf5	$F(28, 397)=0.06$, p = .807	$F(28, 397)=1.12$, p = .292
IPIf6	$F(28, 397)=2.08$, p = .150	$F(28, 397)=11.42$, p = .001
IPIf7	$F(28, 397)=8.00$, p = .005	$F(28, 397)=0.53$, p = .468

Statistically significant differences between the mean scores appeared in Communication & Fine Arts on four factors (IPIf1, IPIf2, IPIf4, and IPIf7) and in Education on five factors (IPIf1, IPIf2, IPIf3, IPIf4, and IPIf6). Partial Eta Squared values demonstrated that less than 3% of variation across the factors is explained by either Communication & Fine Arts or Education. While the findings appeared significant, they did not account material differences in the mean scores.

Differences in Training and Preparation. What are the differences in training and preparation (undergraduate major, graduate concentration, level of education, level and sources of exposure to instructional strategies) among college faculty teaching within the same academic discipline? Looking separately at respondents in each specific instructional discipline, basic frequencies and descriptive statistics were run on select demographics: number of years teaching, level of education, graduate concentration, undergraduate major, and level of exposure to adult learning theories, instructional strategies, and/or methodologies.

The number of year teaching was broken into seven distinct categories: ≤ 1 year, 2-5 years, 6-10 years, 11-20 years, 21-30 years, 31-40 years, and ≥ 41 years. Table 33 provides a look at the percent of faculty in each category employed within the instructional disciplines.

Table 33	*Frequencies: Number of Years Teaching*							
Instructional Disciplines	**≤ 1 yr**	**2-5**	**6-10**	**11-20**	**21-30**	**31-40**	**≥ 41**	**?**
Business & Industry	17.1%	17.1%	14.6%	21.9%	7.3%	7.3%	2.4%	12.2%
Communication & Fine Arts	22.9%	31.3%	16.7%	10.4%	8.3%	---	2.1%	8.3%
Education	17.2%	36.2%	12.1%	13.8%	5.2%	5.2%	---	10.3%
Engineering	25.8%	38.7%	6.5%	16.1%	12.9%	---	---	---
Humanities	6.7%	24.4%	17.8%	24.4%	8.9%	6.7%	2.2%	8.9%
Math & Computer Science	14.3%	23.8%	14.3%	14.3%	19.0%	---	---	14.3%
Medical Sciences	5.3%	25.0%	22.4%	19.7%	10.5%	6.6%	1.3%	9.2%
Natural Sciences	15.0%	26.7%	8.3%	25.0%	13.3%	6.7%	---	5.0%
Social Sciences	18.2%	37.5%	15.9%	12.5%	9.1%	3.4%	---	3.4%
Multiple Disciplines	22.0%	34.1%	9.8%	17.1%	4.9%	4.9%	---	7.3%

With the exception of Business & Industry, the largest percent of faculty respondents in each discipline has been teaching between two to five years. A look at Engineering reveals that 64.5% of the faculty has been teaching for five years or less. In both Engineering and Mathematics & Computer Science, no one reported teaching more than twenty five years. Business & Industry (9.7%), Humanities (8.9%), and Medical Sciences (7.9%) hosted the largest share of seasoned faculty, having taught more than thirty years. Medical Sciences boasts the highest percent of faculty teaching more than five years.

Respondents were asked to disclose their level of education. A look into each separate discipline provides a greater sense of preparation and training within each discipline. Table 34 provides the level of education among survey respondents in each of the instructional disciplines.

Table 34	*Frequencies: Level of Education*					
Instructional Disciplines	**No Degree**	**Associate Degree**	**Bachelor Degree**	**Master's Degree**	**Professional Degree**	**Doctorate Degree**
Business & Industry	2.4%	4.9%	12.2%	29.3%	12.2%	36.6%
Communication & Fine Arts	---	2.1%	27.1%	50.0%	6.3%	14.6%
Education	---	---	8.6%	51.7%	---	39.7%
Engineering	---	3.2%	19.4%	12.9%	3.2%	58.1%
Humanities	---	---	11.1%	28.9%	4.4%	55.6%
Math & Computer Science	---	---	19.0%	33.3%	---	47.6%
Medical Sciences	---	---	6.6%	30.3%	18.4%	44.7%
Natural Sciences	---	1.7%	18.3%	15.0%	1.7%	63.3%
Social Sciences	---	---	9.1%	44.3%	4.5%	40.9%
Multiple Disciplines	---	2.4%	17.1%	36.6%	7.3%	34.1%

In addition to having the largest percent of faculty teaching more than five years, Medical Sciences touts having the greatest percent (63.1%) of faculty on staff with first professional degrees (M.D.) and doctorate degrees (Ph.D.). Following close behind was Engineering (61.3%) and Humanities (60.0%). Fewer faculty respondents in Education (39.7%) and Communication & Fine Arts (20.9%) held professional and doctorate degrees, most were teaching with a Master's degree. Communication & Fine Arts also hosts the highest percent (27.1%) teaching with Bachelor's degrees and Business & Industry with less than a Bachelor's degree (7.3%).

Respondents were also queried on concentration of study in graduate school as well as undergraduate major. A compelling number of respondents within each instructional discipline reported multiple graduate concentrations: Business & Industry (31.7%), Communication & Fine Arts (25%), Education (41.4%), Engineering (25.8%), Humanities (26.7%), Mathematics & Computer Science (19%), Medical Sciences (17.1%), Natural Sciences (20%), Social Sciences (23.9%), and Multiple Disciplines (80.5%). Eighty percent of those teaching in multiples discipline indicated having multiple concentrations in their graduate studies.

A review of undergraduate majors presents a similar trend: Business & Industry (24.4%), Communication & Fine Arts (27.1%), Education (19%), Engineering (9.7%), Humanities (24.4%), Mathematics & Computer Science (19%), Medical Sciences (14.5%), Natural Sciences (15%), Social Sciences (15.9%), and Multiple Disciplines (34.1%).

Participants were provided a list of possible sources of exposure to adult learning theories, instructional strategies, and/or methodologies and asked to estimate level of exposure: High, moderate, low, or no exposure. The level of exposure varied: High exposure (16.9%), moderate exposure (33.6%), mild exposure (39.67%), and no exposure (9.2%). Table 35 presents a more detailed look at the rate of exposure within each instructional discipline.

Table 35	*Frequencies: Level of Exposure to Instructional Methods*			
	High	**Moderate**	**Mild**	**None**
Business & Industry	19.5%	36.6%	41.5%	---
Communication & Fine Arts	16.7%	16.7%	52.1%	14.6%
Education	32.8%	32.8%	29.3%	3.4%
Engineering	3.2%	38.7%	45.2%	12.9%
Humanities	22.2%	42.2%	22.2%	13.3%
Math & Computer Science	9.5%	42.9%	23.8%	23.8%
Medical Sciences	15.8%	42.1%	34.2%	7.9%
Natural Sciences	8.3%	26.7%	48.3%	16.7%
Social Sciences	22.7%	27.3%	44.3%	4.5%
Multiple Disciplines	24.4%	29.3%	34.1%	12.2%

The proportion of faculty who indicated that they had no exposure to adult learning theories, instructional strategies, and/or methodologies raised concerns. The range is 3.4% to 23.8%. The following disciplines acknowledged disconcerting rates of low or no exposure to instructional methods: Communication & Fine Arts (66.7%), Natural Sciences (65.0%), and Engineering (58.1%). All respondents in Business & Industry reported having exposure to instructional strategies and methodologies. Education (65.6%), Humanities (64.4%), and Medical Sciences (57.9%) held the highest combined rates of moderate to high exposure. Across the disciplines, those with exposure to adult learning theories, teaching methods, and/or instructional strategies, cited multiple sources of exposure with 25.4% pointing to five or more sources of exposure. Highest rates of exposure in each discipline came through the following sources:

- Business & Industry - Professional Journals (26.8%) and Conferences (24.4%),
- Communication & Fine Arts - Graduate (25%) and Undergraduate Coursework (18.8%),

- Education - Professional Journals (20.7%) and Undergraduate Coursework (17.2%),
- Engineering - Conferences (29.0%) and Graduate Coursework (19.4%),
- Humanities - Professional Journals (24.4%) and Literature (15.6%),
- Math & Computer Science - Undergraduate (33.3%) and Graduate (14.3%) Coursework,
- Medical Sciences - Professional Journals (22.4%), Conferences and Literature (15.8%),
- Natural Sciences - Conferences (30%) and Undergraduate Coursework (23.3%),
- Social Sciences - Conferences (20.5%) and Literature (18.2%), and
- Multiple Disciplines – Professional Journals (26.8%) and Conferences (24.4%).

Conferences and professional journals served as the leading sources of exposure to adult learning theories, instructional strategies, and/or methodologies, followed by graduate and undergraduate coursework.

Factorial MANOVAs. A factorial MANOVA was completed for each instructional discipline assessing the impact of level of education as well as level of exposure to adult learning theories, instructional strategies, and/or methodologies on instructional perspectives. This allowed for a careful inspection of within each discipline. SPSS produced a warning "Box's Test of Equality of Covariance Matrices is not computed because there are fewer than two non-singular cell covariance matrices for Business & Industry, Humanities, Mathematics & Computer Science, and Multiple Disciplines. The remaining disciplines reported the following significance values for Box's M: Communication & Fine Arts (.752), Education (.463), Engineering (.004), Medical Sciences (.482), Natural Sciences (.682), Social Sciences (.940). Values exceed .001 indicating that the assumption of homogeneity of variance-covariance matrices has not been violated in regards to these six disciplines; however, given that Box's M was not computed for four of the disciplines, Pillai's Trace was utilized. Pillai's Trace values with significance can be found for each variable in Table 36.

Table 36	*Factorial MANOVAs – Pillai's Trace Values w/Sig.*					
	Level of Education		**Level of Exposure**		**Education * Exposure**	
Business & Industry	1.342	(.435)	.792	(.345)	.976	(.730)
Communication & Fine Arts	.428	(.978)	.687	(.248)	.960	(.887)
Education	.261	(.561)	**.874 ***	**(.016)**	.460	(.732)
Engineering	1.549	(.449)	.850	(.714)	1.273	(.484)
Humanities	.335	(.954)	.647	(.325)	.763	(.781)
Math & Computer Science	1.303	(.127)	**1.977***	**(.032)**	1.073	(.850)
Medical Sciences	.231	(.826)	.481	(.051)	**.839***	**(.042)**
Natural Sciences	.596	(.313)	**.914***	**(.000)**	.633	(.229)
Social Sciences	.320	(.679)	.490	(.103)	.647	(.389)
Multiple Disciplines	1.052	(.666)	.888	(.237)	1.066	(.965)

Out of thirty values only four were significant at the .05 level, pointing toward statistically significant differences in the mean scores. Three resulted from level of exposure. This drew attention away from level of education and toward exposure. A review of the Exposure block in the Tests of Between-Subjects Effects showed the following results significant at the .05 level: Education – IPIf1 (.025) and IPIf3 (.010), Mathematics & Computer Science – IPIf1 (.015) and IPIf4 (.009), and Natural Sciences - IPIf1 (.003), IPIf2 (.005), IPIf3 (.000) IPIf4 (.007), and IPIf6 (.004). The combined effect of level of education and level of exposure showed only one statistically significant result (.042) in Medical Sciences on IPIf7.

Table 37 provides a detailed review of the significance values of Levene's test reported for each factor per instructional discipline.

Table 37	*Factorial MANOVAs – Significance Values for Levene's Test*						
Source	**IPIf1**	**IPIf2**	**IPIf3**	**IPIf4**	**IPIf5**	**IPIf6**	**IPIf7**
Business & Industry	.355	**.024**	**.057**	.119	**.003**	.219	**.003**
Communication & Fine Arts	**.002**	**.034**	**.003**	**.004**	**.032**	.313	.027
Education	.133	.411	**.048**	.370	.609	.060	.065
Engineering	.114	.076	.291	.303	.153	.189	.314
Humanities	.137	.241	.657	.381	.133	.226	.557
Math & Computer Science	.383	**.009**	.262	**.002**	**.041**	**.017**	.334
Medical Sciences	**.000**	**.000**	**.000**	**.004**	.071	.158	**.012**
Natural Sciences	**.030**	**.000**	.203	.514	.178	.347	.421
Social Sciences	.305	**.040**	**.003**	**.048**	.477	.081	.134
Multiple Disciplines	.253	**.002**	.804	**.002**	.585	.202	.176

Values less than .05 demonstrate that assumption of equality of variance was violated for that variable. To reduce the chance of a Type I error, a more conservative alpha level was set using the Bonferroni adjustment (.05/7 dependent variables; $\alpha = .007$). Results were considered significant at $p \leq .007$. This ruled out the results initially found in Education, Mathematics & Computer Science, and Medical Sciences were ruled out. All focus zoomed in on the influence of level of exposure on IPIf1, IPIf2, IPIf3, IPIf4, and IPIf6 within Natural Sciences.

A review of Partial Eta Squared values showed that level of exposure explained a sizable portion of the variation in the mean scores on these five factors: IPIf1 (24.7%), IPIf2 (23.4%), IPIf3 (37.3%), IPIf4 (21.9%), and IPIf6 (24.1%). These results were found statistically significant and warranted a deeper investigation into variations in instructional perspectives based on exposure to adult learning theories, methods, and/or instructional strategies.

Variations in Instructional Perspectives Based on Exposure. Are there variations in instructional perspectives among faculty members of similar MBTI types teaching in same academic disciplines that might be related to exposure to adult learning theories, methods, and/or instructional strategies? Are there variations in instructional perspectives among faculty members of similar MBTI types teaching in same academic disciplines? If so, are these differences related to exposure to adult learning theories, methods, and/or instructional strategies? Insight into this subsequent research question was made possible by conducting a series of ANOVAs as well as factorial MANOVAs.

ANOVAs. Looking within each Instructional Discipline separately, a one way analysis of variance between groups was conducted drawing on MBTI Temperament as an independent variable with the IPI total score serving as the dependent variable. The level of significance were reported for Levene's Test: Business & Industry (.993), Communication & Fine Arts (.853), Education (.632), Engineering (.181), Humanities (.411), Mathematics & Computer Science (.695), Medical Sciences (.986), Natural Sciences (.819), Social Sciences (.824), and Multiple disciplines (.655). The homogeneity of variance assumption was not violated as each value exceeds .05. The Statistics were reported in the ANOVA tables:

- Business & Industry – $F(2, 38)=2.13$, $p = .133$,
- Communication & Fine Arts – $F(3, 44)=.50$, $p = .682$,
- **Education – $F(3, 54)=3.97$, $p = .013$**,
- Engineering – $F(3, 27)=1.03$, $p = .397$,
- Humanities – $F(2, 42)=1.41$, $p = .256$,
- Mathematics & Computer Science – $F(3, 17)=1.23$, $p = .328$,
- **Medical Sciences – $F(3, 72)=5.55$, $p = .002$**,
- Natural Sciences – $F(3, 56)=2.41$, $p = .077$,

- **Social Sciences – $F(3, 84)=6.55$ $p < .001$**, and
- Multiple disciplines – $F(3, 37)=1.73$, $p = .178$.

These values indicate there are significant differences among groups in Education, Medical Sciences, and Social Sciences, warranting a careful review of mean differences in these instructional disciplines. Table 38 provides a look at the means scores of each MBTI temperament within each instructional discipline.

Table 38	*ANOVAs: Modified IPI Total – Mean Scores*			
	NT	**NF**	**SJ**	**SP**
Business & Industry	158.9	171.9	157.6	---
Communication & Fine Arts	163.8	165.1	170.8	158.6
Education	**165.1**	**179.4**	171.7	**156.5**
Engineering	155.5	141.4	153.1	143.0
Humanities	161.7	169.2	167.8	165.1
Math & Computer Science	151.5	146.3	161.6	160.5
Medical Sciences	165.5	**171.7**	**156.8**	**149.7**
Natural Sciences	156.7	167.0	152.2	147.2
Social Sciences	**168.9**	**165.4**	**149.6**	161.2
Multiple Disciplines	163.7	173.7	161.7	156.0

Statistically significant differences in Education were found between these groups: NFs & NTs (.047) and NFs & SPs (.036). Statistically significant differences in Medical Sciences were found between these groups: NFs & SJs (.010) and NFs & SPs (.008). Statistically significant differences in Social Sciences were found between these groups: NFs & SJs (.006) and NTs &

SJs (.000). These results demonstrate that variations in instructional perspectives among faculty members teaching in same academic disciplines do exist.

Factorial MANOVA. Moving deeper into the investigation to explore "Are these differences related to exposure to adult learning theories, methods, and/or instructional strategies?", a factorial MANOVA for each MBTI temperament was conducted (Appendix T). Instructional discipline and level of exposure served as the independent variables and the seven factors of the Modified Instructional Perspectives Inventory served as dependent variables.

The following significance values were associated with Box's M: NTs (.023), NFs (.026), and SJs (.006). Box's Test of Equality of Covariance was not computed for Sensation-Perceivers as there were fewer than two non-singular cell covariance matrices. The first three values are larger than .001, indicating the assumption of homogeneity of variance-covariance matrices was not violated. Since however, Box's M was not computed for SPs, Pillai's Trace was selected as the multivariate test of significance. Table 39 provides Pillai's Trace values with corresponding level of significance for each variable across the MBTI Temperaments.

Table 39	*Factorial MANOVAs – Pillai's Trace Values w/Significance.*		
	Level of Exposure	**Instructional Discipline**	**Exposure * Instr. Discipline**
iNtuitive-Thinker	**.348* (.001)**	**.790* (.002)**	1.127 (.490)
iNtuitive-Feeler	**.543* (.009)**	**.985* (.034)**	**1.713* (.010)**
Sensation-Judger	**.537* (.016)**	.721 (.437)	1.151 (.907)
Sensation-Perceiver	1.319 (.379)	2.456 (.366)	2.126 (.697)

Among iNtuitive-Thinkers, statistically significant differences in dependent variables emerged as a result of level of exposure and instructional discipline. Level of exposure produced statistically significant differences in three out of the four MBTI temperaments (NT, NF, and SJ) as did

instructional discipline within two temperaments (NT and NF). And the combined interaction of level of exposure and instructional discipline accounted for variations in IPI factor means scores of iNtuitive-Feelers.

Levene's test for homogeneity of variances assesses whether the variance in scores is the same for each of the groups. If values from Levene's test are $p > .05$, then the assumption of homogeneity of variance has not been violated. Values provided in Table 40 demonstrate that results from Levene's Test were mixed.

Table 40	*Factorial MANOVAs: Levene's Test Values w/ Significance*			
	NT	**NF**	**SJ**	**SP**
IPIf1	4.298* **(.000)**	2.257* **(.001)**	1.707* **(.029)**	2.304 (.061)
IPIf2	3.380* **(.000)**	2.249* **(.001)**	1.335 (.151)	2.688* **(.034)**
IPIf3	2.812* **(.000)**	1.388 (.116)	1.621* **(.043)**	2.577* **(.040)**
IPIf4	2.657* **(.000)**	1.852* **(.012)**	1.512 (.071)	2.356 (.056)
IPIf5	2.090* **(.001)**	1.428 (.097)	1.534 (.064)	1.780 (.141)
IPIf6	1.241 (.190)	1.214 (.236)	1.416 (.107)	1.385 (.272)
IPIf7	1.400 (.088)	1.382 (.118)	1.361 (.136)	1.985 (.100)

Once again, the assumption of equality of variance was violated on some variables, therefore, a more conservative alpha level ($\alpha = .007$) was adopted. A careful review of the Exposure block in the Tests of Between-Subjects Effects identified the dependent measures (IPI factors) significantly impacted by this variable at the .05 level:

- NTs: IPIf1 (.009), IPIf2 (.018), **IPIf3 (.000)**, **IPIf4 (.004)**, and **IPIf6 (.000)**;
- NFs: IPIf1 (.043), **IPIf2 (.000)**, IPIf3 (.013), **IPIf4 (.006)**, and **IPIf6 (.000)**; and
- SJs: **IPIf1 (.001)**, IPIf2 (.047), **IPIf3 (.000)**, IPIf4 (.014), IPIf5 (.015) and IPIf6 (.045).
- SPs: No significant differences found.

Those values in bold were considered statistically significant at the stricter alpha level (.007).

With regard to Sensation-Judgers, exposure instructional strategies accounted for 20.3% of the variation in mean scores on Teacher Empathy with Learners (IPIf1); however, it did not yield as much impact on iNtuitive-Feelers (11.1%), iNtuitive-Thinkers (8.9%), or Sensation-Perceivers (3.8%). Exposure to instructional strategies explained 21.2% of variation in mean scores for Teacher Trust of Learners (IPIf2) of iNtuitive-Feelers with less impact on the remaining temperaments: SJs (11.2%), NTs (7.7%), and SPs (0.5%). Planning & Delivery of Instruction (IPIf3) was influenced by exposure to instructional methodologies at the following rates: SJs (26.1%), NTs (19.3%), NFs (14.1%), and SPs (9.5%). The percent of variation in mean scores for Accommodating Learner Uniqueness (IPIf4) is as follows: NFs (15.6%), SJs (14.3%), NTs (9.9%), and SPs (0.9%). The remaining results explain the percent of variation in mean scores for Learner-Centered Learning Process (IPIf6): NFs (27%), SPs (26.4%), NTs (16.4%), and SJs (11.3%).

A review of Tests of Between-Subjects Effects for NTs and NFs showed statistically significant differences in mean scores related to Instructional Discipline were restricted to iNtuitive-Feelers: IPIf2 (.001), IPIf4 (.001), and IPIf6 (.001). Instructional Discipline accounted for the following percent of variation: Teacher Trust of Learners (29.8%), Accommodating Learner Uniqueness (29%), and Learner-Centered Learning Process (24.7%).

These findings provide documented evidence that variations in instructional perspectives among faculty members of similar MBTI types teaching in same academic disciplines do exist and that exposure to adult learning theories, methods, and/or instructional strategies accounts for a significant proportion of the variation in mean scores.

Summary

This quantitative research study explores the relationship between the Myers-Briggs Type Indicator and instructional perspectives among faculty across academic disciplines at the University of Missouri's four campuses. Data was analyzed using SPSS. Basic frequencies and measurements of central tendency were calculated as the groundwork for further statistical analysis. A variety of statistical tool were utilized in examining the role psychological type, as measured by the Myers-Briggs Type Indicator (MBTI), plays in predicting instructional perspectives, as measured by the Modified Instructional Perspectives Inventory (Modified-IPI). The null hypothesis was rejected and the alternative hypothesis offers the best description of the data collected. This study also included an investigation into variations in instructional perspectives among faculty members of similar MBTI types, teaching in the same academic disciplines and whether or not these variations might be related to exposure to adult learning theories, methods, and/or instructional strategies. A variety a statistical tools were used to investigate possible patterns. Basic frequencies and descriptive statistics provided a glimpse of MBTI temperaments and types at the campus level as well as a closer look across and within instructional disciplines. Analysis of variance (ANOVA) was the statistical method chosen to explore differences between the means of the overall IPI score for instructors teaching in the different disciplines as well as those employed by the different campuses. Across the instructional disciplines, there were significant differences in the mean scores produced by Education and three other instructional disciplines: Engineering, Mathematics & Computer Science, and Natural Sciences. These findings provide documented evidence that variations in instructional perspectives among faculty members of similar MBTI types teaching in same academic disciplines do exist and that exposure to adult learning theories, methods, and/or instructional strategies accounts for a significant proportion of the variation in mean scores.

Chapter 5: Conclusions

This quantitative research study explores the relationship between the Myers-Briggs Type Indicator and instructional perspectives among faculty across academic disciplines at the University of Missouri's four campuses. Primarily it examines the role psychological type, as measured by the Myers-Briggs Type Indicator (MBTI), plays in predicting instructional perspectives, as measured by the Modified Instructional Perspectives Inventory (Modified-IPI). This study also included an investigation into variations in instructional perspectives among faculty members of similar MBTI types, teaching in the same academic disciplines and whether or not these variations might be related to exposure to adult learning theories, methods, and/or instructional strategies. This chapter is organized into six sections: Research findings and interpretation, research contributions, practical implications and applications, research limitations, recommendations for future research, and summary of conclusions.

Research Findings and Interpretation

Cronbach's alpha coefficient was used to confirm the reliability of both the Myers-Briggs Type Indicator and the Modified Instructional Perspectives Inventory. Cronbach's alpha coefficients for the MBTI scales were reported: E-I scale (.924), S-N scale (.911), T-F scale (.897), and J-P scale (.923), demonstrating high internal consistency. Cronbach's alpha coefficients for the IPI total score and each of the seven factors were calculated through SPSS: IPI total (.900), IPIf1 (.697), IPIf2 (.853), IPIf3 (.753), IPIf4 (.721), IPIf5 (.704), IPIf6 (.689), and IPIf7 (.639). At .900, the Overall Instructional Perspectives Inventory clearly demonstrates internal consistency reliability.

Preliminary analysis was conducted using Pearson's correlation coefficient. The directional relationship between each MBTI scale and the total IPI score and seven IPI factors were as follows: Extraversion-Introversion (negative), Sensing-iNtuition (positive), Thinking-

Feeling (positive), and Judging-Perceiving (positive). The (r) values, denoting strength of relationship, for each MBTI scale and the total IPI score and seven IPI factors ranged as follows: Extraversion-Introversion (-.010 to -.296), Sensing-iNtuition (.132 to .258), Thinking-Feeling (.101 to .252), and Judging-Perceiving (.029 to .210). The r values less than .30 are small.

Since Pearson's Correlation Coefficient can be calculated using dichotomous variables, each of the ten instructional disciplines (separate variables) were run against the total IPI score and the seven factors of the Modified Instructional Perspectives Inventory. The correlation coefficients were all less than .30 across the variables. There were, however, some notable differences in the direction of the relationships. Two disciplines shared positive relationships with instructional perspectives: Communication & Fine Arts (three significant at the 0.01 level and one significant at the 0.05 level) and Education (five significant at the 0.01 level and one significant at the 0.05 level). Conversely, three disciplines shared negative relationships with instructional perspectives: Engineering (three significant at the 0.01 level and one significant at the 0.05 level), Mathematics & Computer Science (one significant at the 0.01 level and one significant at the 0.05 level), and Natural Sciences (two significant at the 0.01 level and two significant at the 0.05 level). Findings derived from the preliminary analyses warranted further investigation. These relationships were explored in greater depth during the analysis of subsequent research questions.

Primary Research Question. The primary research question is "What is the relationship between Myers-Briggs Type Indicator and the Modified Instructional Perspectives Inventory?" Hypotheses include:

H_1 = A significant relationship between the MBTI and Modified IPI exists.

H_0 = There is no relationship between the MBTI and the Modified IPI.

This research question was explored through separate analyses using a variety of statistical tools. Preferences on each of the four MBTI dichotomous scales, MBTI temperament, and MBTI whole type served as independent variables while the overall score from the modified-IPI along with scores from each of the seven subscales were designated as dependent variables. The four MBTI scales could be viewed as both continuous and categorical variables.

A series of one-way between-groups analysis of variance were conducted to investigate the impact of the MBTI on instructional perspectives. The first four series investigated the role of each dichotomous scale separately: Extraversion-Introversion, Sensation-iNtuition, Thinking-Feeling, and Judging-Perceiving. The second centered on the four MBTI temperaments. The final series focused on the variance in scores between the 16 MBTI whole types. Twenty-six ANOVAs produced results that demonstrate statistically significant differences at the $p < .01$ level and another eight at the $p < .05$ level. Table 41 provides a matrix of significance values reported for each ANOVA with all results significant at .05 highlighted in bold.

Table 41	*ANOVAs: Between Groups Significance*							
	IPI-T	**IPIf1**	**IPIf2**	**IPIf3**	**IPIf4**	**IPIf5**	**IPIf6**	**IPIf7**
Extraversion-Introversion	**.000**	**.000**	**.000**	**.000**	**.000**	**.014**	**.000**	.731
Sensation-iNtuition	**.000**	**.007**	**.001**	**.040**	**.010**	**.029**	.137	**.000**
Thinking-Feeling	**.001**	**.030**	**.000**	.306	.054	**.006**	.194	**.029**
Judging-Perceiving	.146	.342	.968	.523	.513	.400	.230	**.000**
MBTI Temperaments	**.000**	**.006**	**.000**	.132	**.009**	**.030**	**.034**	**.000**
MBTI Whole Types	**.000**	**.001**	**.000**	**.005**	**.003**	.066	**.000**	**.000**

Among the four dichotomous scales, the E-I scale had the greatest impact while the effect of the other three scales decreased in succession with the J-P scale having the least influence. A review of the overall IPI mean scores showed Extraverts had higher scores than Introverts,

iNtuitives held a clear advantage over Sensors, Feelers outperformed Thinkers, and Judgers and Perceivers ran the closest race.

The S-N scale is the key to determining MBTI temperament. Preferences for iNtuition are linked to the Thinking-Feeling scale to form two temperaments: iNtuitive-Thinkers (NTs) and iNtuitive-Feelers (NFs). Preferences for Sensation are linked to the J-P scale to form the remaining two temperaments: Sensation-Judgers (SJs) and Sensation-Perceivers (SPs). Among the four MBTI temperaments, statistically significant differences in mean scores of the IPI total and each factor, except IPIf3. Mean scores reported on the IPI total by temperament: NF (168), NT (161), SJ (157), and SP (153).

Finally, the four MBTI scales interact to create sixteen MBTI types. ANOVAs based on MBTI type showed statistically significant differences ($p < .01$) in mean scores of the IPI total and each factor, except IPIf5. The highest IPI total mean score was achieved by ENFPs (173) and the lowest was logged by ISTPs (146).

To compensate for a multicollinearity issue among the dependent variables, the Modified IPI total score was eliminated from consideration in conjunction with the seven IPI factors in all successive MANOVAs and canonical correlations. To reduce the potential of Type I errors, the Bonferroni adjustment was used to establish a stricter alpha level ($\alpha=.007$). Results considered statistically significant were restricted to significance values at or below the .007 level.

A series of MANOVAs were conducted for each primary independent variable (four MBTI scales, MBTI temperament, and MBTI whole type) against the seven IPI factors. Significance values reported by tests of between-subject effects mirror those from the previous set of ANOVAs. Table 42 reports significance values from the tests of between-subject effects; values significant at the .007 level appear in bold type.

Table 42	*MANOVAs: Tests of Between-Subject Effects*						
	IPIf1	**IPIf2**	**IPIf3**	**IPIf4**	**IPIf5**	**IPIf6**	**IPIf7**
Extraversion-Introversion	**.000**	**.000**	**.000**	**.000**	.014	**.000**	.731
Sensation-iNtuition	**.007**	**.001**	.040	.010	.029	.137	**.000**
Thinking-Feeling	.030	**.000**	.306	.054	**.006**	.194	.029
Judging-Perceiving	.342	.968	.523	.513	.400	.230	**.000**
MBTI Temperaments	**.006**	**.000**	.132	.009	.030	.034	**.000**
MBTI Whole Types	**.001**	**.000**	**.005**	**.003**	.066	**.000**	**.000**

While the number of Introverts in the study exceeded the number of Extraverts, Extraverts achieved higher mean scores across each of the seven factors with statistically significant differences on factors 1, 2, 3, 4, and 6. Across all seven factors, iNtuitives held an advantage over Sensors in both numbers and mean scores with statistically significant differences on IPIf1, IPIf2 and IPIf7. Thinkers outnumbered the Feelers; however, the Feelers maintained slightly higher mean scores on each of the seven factors with statistically significant differences on IPIf2 and IPIf5. There were fewer Perceivers than Judgers, yet the Perceivers gained a very slim edge on Judgers in mean scores across the seven factors. The only statistically significant difference was found on IPIf7.

A comparison of group means across the four MBTI temperaments (NT, NF, SJ, and SP) acknowledged that iNtuitive-Feelers retained the highest means across all seven factors on the Modified Instructional Perspectives Inventory. Differences in temperament were statistically significant at the .007 on IPIf1, IPIf2, and IPIf7. A comparison of group means revealed the two highest means and two lowest means were achieved by the following MBTI whole types:

- IPIf1: Teacher Empathy with Learners – **ENFP** & ENTJ and ISFJ & **ISTP**,
- IPIf2: Teacher Trust of Learners – **ENFP** & ENFJ and ISFP & **ISTP**,

- IPIf3: Planning & Delivery of Instruction – ESFP & **ENFP** and ISFJ & ISFP,
- IPIf4: Accommodating Learner Uniqueness – INFP & **ENFP** and INTP & **ISTP**,
- IPIf5: Teacher Insensitivity Toward Learners – ESFP & **ENFP** and ESTP & **ISTP**,
- IPIf6: Learner-Centered Learning Process – ESFJ & **ENFP** and ISFP & ESFP,
- IPIf7: Teacher-Centered Teaching Process – ESFP & ENTP and ESTP & ESFJ.

Differences were significant at .007 on all the factors except IPIf5. ENFPs held the highest means on IPIf1 and IPIf2 as well as the second highest means on IPIf3, IPIf4, IPIf5, and IPIf6. ESFPs held the highest means on IPIf3, IPIf5, and IPIf7. Conversely, ISFPs scored the lowest mean on IPIf3 and the second lowest means on IPIf2 and IPIf6. ISTPs held the lowest means on IPIf1, IPIf2, IPIf4, and IPIf5. As the four MBTI dichotomous scales interact to form the sixteen MBTI whole types, these trends warrant a closer look at the interaction among these four variables.

Factorial MANOVA helps determine whether two or more categorical grouping variables (and their interactions) significantly affect optimally weighted linear combinations of two or more continuous variables. A factorial MANOVA was conducted with the four MBTI scales in relationship to scores from each of the seven IPI subscales. Results confirmed that the E-I had the greatest impact on the seven IPI factors.

Finally, continuous quantitative data from the four MBTI scales and the seven factors of modified-IPI were used to conduct a canonical correlation. Norman and Streiner (1999) report that canonical correlation allows the researcher to find the best "weights" for the IVs as well as the best "weights" for the DVs that maximize the correlation between the two sets of variables by ignoring the distinction between 'independent' and 'dependent' variables, considering them as 'predictors' and 'criteria'. The first two canonical pairs account for 85.97% of the total variance shared by all the root pairs. Together, the first three roots account for 98.68% of the

total variance with the fourth accounting for less than 2% of variance. All three roots were statistically significant at .000, .000, and .025 respectively. The univariate analysis, presented in Table 43 with t-Values and level of significance, confirm results from previous analyses.

Table 43	*Canonical Correlation t-Values (Significance)*			
	E-I	**S-N**	**T-F**	**J-P**
IPIf1	-4.28814 (**.000**)	2.64187 (**.009**)	1.82861 (.068)	-1.36103 (.174)
IPIf2	-3.87929 (**.000**)	2.69830 (**.007**)	4.32059 (**.000**)	-2.32079 (**.021**)
IPIf3	-4.76246 (**.000**)	2.56038 (**.011**)	1.52727 (.127)	-1.43468 (.152)
IPIf4	-3.35889 (**.001**)	2.09377 (**.037**)	2.07026 (**.039**)	-.86452 (.388)
IPIf5	-3.06515 (**.002**)	2.22956 (**.026**)	1.56621 (.118)	-.46674 (.641)
IPIf6	-5.88520 (**.000**)	1.35891 (.175)	1.93722 (.053)	-.62204 (.534)
IPIf7	.91910 (.359)	3.74953 (**.000**)	.21511 (.830)	2.27511 (**.023**)

Analyses provide collective evidence that a statistically significant relationship between the Myers-Briggs Type Indicator and the Modified Instructional Perspectives Inventory does exist. The null hypothesis (H_0 = There is no relationship between the MBTI and the Modified IPI) was rejected. The alternative hypothesis is the best statement reflecting the data. Psychological type, as measured by the Myers-Briggs Type Indicator (MBTI), serves as a predictor of instructional perspectives, as measured by the Modified Instructional Perspectives Inventory (Modified-IPI).

The highest mean scores on the overall IPI total and all seven factors were achieved by iNtuitive-Feelers. As iNtuitives, both NTs and NFs prefer abstract theories and concepts over practical details; hence, they are drawn to higher education in large numbers. NTs, prone to pragmatism, enjoy solving complex problems while NFs are motivated by helping people realize their potential. In contrast of iNtuitives, Sensors are drawn to concrete facts and practical details.

Sensors prefer to use skills already mastered and when forced to learn new skills, prefer a hands-on approach. Research estimates that Sensors outnumber iNtuitives in our society (Keirsey, 1984; Myers & McCaully, 1985); however, among faculty ranks iNtuitives outnumber Sensors nearly two to one. SJs prefer well ordered environments, following rules and respecting the rights of others. SPs, unconventional and impulsive, are kinesthetically gifted. Each temperament offers real value; however, NFs thrive in relation to others. In their quest for meaning and purpose, they derive great satisfaction by investing in others.

In considering different portraits of the sixteen whole types, the findings make sense. Some types possess natural abilities which when honed enable them to become exceptional instructors, while other types are gifted with different abilities. ENFPs achieved the highest mean scores on the overall IPI total, Teacher Empathy with Learners (IPIf1), and Teacher Trust of Learners (IPIf2) as well as the second highest mean scores on IPIf3, IPIf4, IPIf5, and IPIf6. ENFPs are warm, enthusiastic people, typically very bright and full of potential. They possess a broad range of skills and talents and often excel in any area that draws their attention. This contributes to their ability to motivate and inspire others. Achieving the lowest score on the overall IPI total and four of the seven factors (IPIf1, IPIf2, IPIf4, and IPIf5) were ISTPs. Rational and logical, ISTPs have a compelling drive to understand the way things work. These impulsive risk-takers are very action-oriented. Unlike the ENFP, ISTPs are not naturally tuned in to how their words and actions affect others; however, the natural abilities that help ENFPs excel as instructors could be mastered by ISTPs as learned skills and methodologies. Each of the sixteen MBTI types has natural talents and abilities which are polished through the pursuit of lifelong learning and continued skill development. Jung is often quoted as saying, "That which irritates us in others often leads to an understanding of self." By engaging in genuine dialogue, each type holds the power of learning from and aiding in the development of the other.

Subsequent Research Questions. Subsequent research questions include:

5. What are the reported MBTI types among college faculty across academic disciplines? 1a) What differences emerge in the reported MBTI types among college faculty teaching in different academic disciplines? 1b) What differences emerge in the reported MBTI types among college faculty teaching within the same academic discipline?
6. What are the instructional perspectives of college faculty across academic disciplines? 2a) What differences emerge in the instructional perspectives among college faculty teaching in different academic disciplines? 2b) What differences emerge in the instructional perspectives among college faculty teaching within the same academic discipline?
7. What are the differences in training and preparation (major, graduate concentration, degree, level and sources of exposure to instructional strategies) among college faculty teaching within the same academic discipline?
8. Are there variations in instructional perspectives among faculty members of similar MBTI types, teaching in the same academic disciplines, related to exposure to adult learning theories, methods, and/or instructional strategies?

Reported MBTI Types among College Faculty across Academic Disciplines. What are the reported MBTI types among college faculty across academic disciplines? What differences emerge in the reported MBTI types among college faculty teaching in different disciplines? What differences emerge in the reported MBTI types among college faculty teaching within the same academic discipline? Basic frequencies and descriptive statistics provided a snapshot of MBTI temperaments and types at the campus level as well as a closer look at MBTI temperaments and types across and within instructional disciplines.

Considered fierce independents, the greatest percent of iNtuitive-Thinkers teach courses in Natural Sciences (15.3%), Social Sciences (14.1%), and Medical Sciences (13.5%). Each MBTI temperament is comprised of four types. The iNtuitive-Thinking temperament includes INTJs (36%), ENTJs (25%), INTPs (22%), and ENTPs (17%). INTJs were somewhat evenly dispersed across the disciplines with a slightly higher percentage teaching in Natural Sciences (15.2%) and the fewest in Business & Industry (6.8%) and Engineering (6.8%). The largest concentration of ENTJs was found teaching in Social Sciences (22.5%), Natural Sciences (15.0%), and Humanities (15.0%); however, none were found teaching in Education. Like the INTJs, the INTPs were fairly disseminated across the disciples with the lowest percent (5.6%) in Business & Industry, Engineering, and Mathematics & Computer Science and the highest percent (13.9%) in Natural Sciences and Education. ENTPs were drawn to the sciences: Medical Sciences (21.4%), Natural Sciences (17.9%), Social Sciences (14.3%), as well as Multiple Disciplines (14.3%); however, there were no ENTPs teaching in Engineering.

Inventive and curious, iNtuitive-Thinkers are driven to achieve, to accomplish, to understand, and to amass power gained through the pursuit of knowledge. Relentless in learning about that which draws their attention and indifferent to things that do not capture their interest, NTs are often labled as gifted and as underachievers (Mamchur, 1996). "Highly analytical and critical, they respect and cooperate with teachers who consistently show intelligence, expertise, and fairness" (Mamchur, 1996, p. 127). Drawn to higher education as lifelong learners, the NT instructor can be somewhat impatient with others and openly critical of any sign of incompetence. Mamchur (1996) warns that when the naturally critical, competitive NT openly "challenges authority, accepted knowledge, and traditional methods of study," (p. 86) keep in mind, "it is always a professional attack, never a personal one, designed to create the best system possible" (p. 86).

Skilled in diplomacy, the largest assemblies of iNtuitive-Feelers were found in Medical Sciences (16.9%), Social Sciences (16.9%), and Education (15.3%). The iNtuitive-Feeling temperament includes ENFPs (32%), INFJs (30%), INFPs (19.4%), and ENFJs (18.6%). The highest clusters of ENFPs were discovered in Education (18.4%) and Social Sciences (18.4%) and none found in Engineering or Mathematics & Computer Science. The largest bands of INFJs teach in Medical Sciences (20%), Social Sciences (17.1%), and Communication & Fine Arts (14.3%) with none found in Mathematics & Computer Science. There were no INFPs represented in Business & Industry. The most sizable group of INFPs teaches in Medical Sciences. While there were no ENTJs in Education, this same discipline drew the highest concentration of ENFJs (22.7%). Like ENFPs and INFJs, there were no ENFJs in Mathematics & Computer Sciences, nor were they found in Engineering or Natural Sciences.

Imaginative and somewhat idealistic, NFs enjoy learning and achievement. They appreciate flexible learning environments that allow the pursuit of individual interests and passions within the context of the course subject. They respond favorably to positive reinforcement and shy away from feedback that comes across as criticism. "When you combine the inventive, push-the-envelope attitude associated with intuition, and the high spirited, values driven orientation of feeling, you have an idealistic change agent, the NF temperament" (Mamchur, 1996, p. 83). "Leaders of causes, NFs use their intuitive skills to invent and predict and design, and their feeling skills to persuade and inspire" (Mamchur, 1996, p. 83). With little desire to control or be controlled, they often take on the role of facilitators in teaching and learning, engaging others in active learning.

Dubbed the stabilizers of society, the highest concentrations of Sensation-Judgers were in Social Sciences (19.5%) and Medical Sciences (18.6%). The Sensation-Judger temperament is comprised of ISTJs (54%), ESTJ (27%), ISFJs (14%), and ESFJs (5%). ISTJs were discovered

teaching in every discipline with the largest percent (18%) in both Medical Sciences and Social Sciences. ESTJs were drawn to these same disciplines with even greater numbers in Medical Sciences (23.3%). Humanities and Mathematics & Computer Science held very slight representations of ISTJs and ISFJs; however there were no ESTJs or ESFJs noted in either discipline. In fact, ESFJs were missing from Business & Industry and Education as well. Fifty percent of the ISFJs were split between Social Sciences and teaching in multiple disciplines, while none were located in Communication & Fine Arts, Education, or Engineering.

Often uncomfortable with new trends in education, the SJ prefers to serve as the stabilizer of the educational world (Mamchur, 1996). Sensation-Judgers are decisive, dependable, systematic, and at times painstakingly thorough (Mamchur, 1996). They respond out of a sense of duty and follow through on obligations. They often bring structure and order to the classroom as they carefully plan lessons in advance. Disruptions are not necessarily welcomed by SJs. While this helps to ensure consistency over time, it also limits responsiveness to the needs of individual learners. SJs are diligent and appreciate any recognition offered.

Sensation-Perceivers are often described as tactical risk takers. These kinesthetic learners are most at risk dropping or stopping out in their education and precious few (7.5%) were represented in this research. Those who persisted were largely found teaching in the sciences: Medical Sciences (21.9%), Natural Sciences (21.9%), and Social Sciences (18.7%). None were found in Business & Industry or Humanities and only one Sensation-Perceiver was located in each of the following disciplines: Engineering (ISTP) and Mathematics & Computer Science (ISFP). Three were found teaching in Communication & Fine Arts: ISTP (1), ESTP (1), and ISFP (1). Education drew only four SPs and all were introverted: ISTP (3) and ISFP (1). Only two ESFPs participated in the study: one teaches in Medical Sciences and the other across multiple disciplines.

Mamchur (1996) reports, “Several longitudinal studies (Keirsey & Bates, 1978; McCaulley, 1977; Myers 1976) show that those students preferring the sensing way of functioning and the perceiving way of interfacing with the environment seem the most resistant to institutional Learning” (p.93) and “of all students, the highest drop-out rate can be found among sensing-perceiving (SP) learners” (p. 93). These kinesthetic learners have a need for freedom and a motivation to act. As realists, they are drawn to that which is practical and relevant. Mamchur makes two key statements concerning SPs, “What a tragedy when a response to need for movement is forced with confinement” (p. 97) and “how much easier to work with the energy than against it” (p. 97). Keirsey (1984) reports “Relatively few SPs stay around higher education long enough to obtain the necessary credentials to teach, and their unique style is largely lost to educational systems and other occupations that demand prolonged formal studies” (p. 158). SPs are bright, witty, and quick to assess situations and respond with needed action, and “most apt to show discrepancies between scores on academic ability tests and grade point average” (Keirsey, 1984). This explains their low numbers present among faculty ranks. Mamchur (1996) goes on to say “The SP does not want to be restricted by too many rules, too much red tape, too much supervision” (p. 88). As instructors, they have a knack for actively engaging learners and a flare for entertaining as they educate; however, they are often viewed as unconventional and undisciplined by their colleagues. Lacking convention and equipped with keen senses, SPs are expert troubleshooters often seeing possible solutions that others miss.

Multivariate analysis (ANOVAs and factorial MANOVA) were conducted to explore group differences across and within each discipline. No statistically significant differences were found. Logistic regression allows the researcher to test models to predict categorical outcomes from independent continuous or categorical variables. Results were inconclusive. The MBTI does not serve as a predictor of instructional discipline.

Instructional Perspectives among College Faculty across Academic Disciplines.

What are the instructional perspectives of college faculty across academic disciplines? What differences emerge in the instructional perspectives among college faculty teaching in different disciplines? What differences emerge in the instructional perspectives among college faculty teaching within the same academic discipline? Analysis of variance (ANOVA) was the statistical method chosen to explore differences between the means of the overall IPI score for instructors teaching in the different disciplines as well as those employed by the different campuses. The impact of two demographic variables was considered as well: Teaching Status and Gender. MANOVAs were conducted to explore differences between the mean scores on each of the seven IPI factors among faculty groups based on Instructional Discipline, Campus, Teaching Status, and Gender.

Across the instructional disciplines, there were significant differences in the mean scores produced by Education and three other instructional disciplines: Engineering, Mathematics & Computer Science, and Natural Sciences. The highest mean scores were produced by faculty teaching in Education, Multiple Disciplines, and Communication & Fine Arts. A closer look at mean scores reported on the combined scales of the Modified Instructional Perspectives Inventory (total score) by faculty across instructional disciplines portrays a slightly different story: Education (170), Multiple Disciplines (166), Communication & Fine Arts (165), Humanities (164), Medical Sciences (163), Social Sciences (160), Business & Industry (159), Natural Sciences (155), Mathematics & Computer Science (153), and Engineering (152). Each of the mean scores fell within the average range (149-184) according to the category levels produced by Stanton (2005).

A comparison of mean scores achieved by faculty from the different UM campuses reveal that the most significant differences are between UMSL and two other campuses: MST

and UMC. Mean scores fell into the following ranges: MST (112-195), UMC (112-200), UMKC (103-207), and UMSL (93-213). The lowest and highest total IPI scores were derived by faculty from UMSL. As with instructional disciplines, the mean scores were within the average range: MST (155), UMC (161), UMKC (161), and UMSL (168). With regard to teaching status, significant differences were observed between adjunct instructors and tenured faculty as well as graduate teaching assistants. Mean scores across the categories were as follows: Adjunct Instructors (168.3), Non-Tenured Faculty (162.3), Tenured Faculty (159.6), and Graduate Teaching Assistants (158.6). Finally, significant differences were found between genders: Female (164) and Male (158). The range of minimum and maximum scores showed that Males (93-213) held both the lowest and highest scores. Once again, the mean scores, according to the scale produced by Stanton (2005), were average across each of the variables analyzed.

Next, a series of MANOVAs was conducted to explore differences between the mean scores on each of the seven IPI factors among faculty groups based on Instructional Discipline, Campus, Teaching Status and Gender. A comparison of group means revealed the two highest means on each scale were achieved by faculty teaching in the following instructional disciplines:

- IPIf1 - Teacher Empathy with Learners – Communication & Fine Arts and Education,
- IPIf2 - Teacher Trust of Learners – Education and Communication & Fine Arts,
- IPIf3 - Planning & Delivery of Instruction – Multiple Disciplines and Education,
- IPIf4 - Accommodating Learner Uniqueness – Education and Communication & Fine Arts,
- IPIf5 - Teacher Insensitivity Toward Learners – Multiple Disciplines and Education,
- IPIf6 - Learner-Centered Learning Process – Education and Multiple Disciplines, and
- IPIf7 - Teacher-Centered Learning Process – Humanities and Medical Sciences.

This same comparison exposed the instructional disciplines in which faculty logged the lowest mean scores on each of the seven factors:

- IPIf1 - Teacher Empathy with Learners – Business & Industry and Engineering,
- IPIf2 - Teacher Trust of Learners – Mathematics & Computer Science & Engineering,
- IPIf3 - Planning & Delivery of Instruction – Natural Sciences and Mathematics & C.S.,
- IPIf4 - Accommodating Learner Uniqueness – Social Sciences and Engineering,
- IPIf5 - Teacher Insensitivity Toward Learners – Engineering and Natural Sciences,
- IPIf6 - Learner-Centered Learning Process – Engineering and Mathematics & C.S., and
- IPIf7 - Teacher-Centered Learning Process – Math & C.S. and Communication & F.A.

A view across institutions illuminated statistically significant differences among faculty teaching at the different campuses on two scales: IPIf2 and IPIf5. Partial Eta Squared values divulge that only 3.9% of variation in Teacher Trust of Learners (IPIf2) and 3.1% of variation in Teacher Insensitivity toward Learners (IPIf5) is explained by campus. It is interesting to note that with the exception of IPIf7, a repeating pattern did emerge: The highest mean scores across the first six factors were collectively achieved by faculty teaching at the University of Missouri-St. Louis and the lowest by faculty at Missouri University of Science & Technology.

Results began to escalate as teaching status was taken into consideration. Values were statistically significant at the .007 level on IPIf1, IPIf2, IPIf3, IPIf4, and IPIf6. Differences in teaching status accounted for 4.5% of the variance in Teacher Empathy with Learners (IPIf1), 5.6% of the variance in Teacher Trust of Learners (IPIf2), 7.7% of the variance in Planning & Delivery of Instruction (IPIf3), 6.6% of the variance in Accommodating Learner Uniqueness (IPIf4), and 5% of the variance in Learner-Centered Learning Process (IPIf6). Once again with the exception of IPIf7, a pattern began to unfold: The highest mean scores across the first six factors were collectively achieved by Adjunct Instructors, while the lowest means became a toss up between Tenured Faculty and Graduate Teaching Assistants.

The MANOVAs illuminated statistically significant differences between faculty teaching across the disciplines on three scales (IPIf2, IPIf4, and IPIf6), faculty teaching at the different campus on two scales (IPIf2 and IPIf5), faculty holding different teaching status on five scales (IPIf1, IPIf2, IPIf3, IPIf4, and IPIf6), and faculty of different genders on three scales (IPIf2, IPIf4, and IPIf6). Factorial MANOVAs were conducted to examine the interaction between these independent variables and their combined impact on the seven IPI factors with each of the disciplines. Findings directed attention toward Communication & Fine Arts as well as Education. Statistically significant differences between the mean scores appeared in Communication & Fine Arts on four factors (IPIf1, IPIf2, IPIf4, and IPIf7) and in Education on five factors (IPIf1, IPIf2, IPIf3, IPIf4, and IPIf6). A close examination of Partial Eta Squared values demonstrated that less than 3% of variation across the factors is explained by either Communication & Fine Arts or Education. While the findings appeared significant, they did not account material differences in the mean scores.

While the findings did not yield material differences in the mean scores, it is important to consider that the mean scores across the disciplines were simply average in an age where there is mounting pressure to rise to a new level of excellence. "The shift towards professionalism in teaching and learning is a natural manifestation of the discourse of excellence" (Light, Cox, & Calkins, 2009, p. 8). This insight underscores the need for increased dialogue and critical reflection. Forsyth (2003, p. ix), as a professor of psychology, makes the following admission:

> I am not born a teacher as some of my colleagues seem to be. Indeed, in graduate school I was all about the research, and so when I took my first academic post, I was ready to measure, manipulate, and publish, but I was unprepared to teach. I, like many other new college professors, was relatively untrained in the pedagogical arts, for I had adopted the worldview that teaching was a duty, whereas scholarly research was a joy.

Forsyth (2003) takes a humble, honest approach to disclosing his struggle, the lessons learned, and the resulting transformation. Bain (2004) insists that in order "to create a new kind of professor who understands the discipline and how it might be learned, we must change the way we develop young scholars and support the existing ones" (p. 177). Seldin (1994) makes two very pointed statements: "There seems to be an ingrained academic reluctance to regard teaching in the same way the profession regards every other set of skills: as something that can be taught. Professors who take painstaking care for method within their discipline of chemistry, history, or psychology, for example, all too often are unreflective when it comes to teaching" (p. 1). Forsyth's critical reflection and willingness to engage in behaviors outside his initial comfort zone increased skill development and improved teaching performance. Seldin (1994) asserts, "Potentially great teachers become great teachers by the same route: through conditioning mind, through acquiring skills, and through practicing amidst intense competition" (p. 1).

Differences in Training and Preparation. What are the differences in training and preparation (undergraduate major, graduate concentration, level of education, and level and sources of exposure to instructional strategies) among college faculty teaching within the same academic discipline? Looking separately at respondents in each specific instructional discipline, basic frequencies and descriptive statistics were run on select demographics: number of years teaching, level of education, graduate concentration, undergraduate major, and level of exposure to adult learning theories, instructional strategies, and/or methodologies.

A factorial MANOVA was completed for each instructional discipline assessing the impact of level of education as well as level of exposure to adult learning theories, instructional strategies, and/or methodologies on instructional perspectives. This allowed for a careful inspection within each discipline. Results were considered significant at $p \leq .007$. This ruled out the results initially found in Education, Mathematics & Computer Science, and Medical

Sciences. All focus zoomed in on the influence of level of exposure on IPIf1, IPIf2, IPIf3, IPIf4, and IPIf6 within Natural Sciences. A review of Partial Eta Squared values showed that level of exposure explained a sizable portion of the variation in the mean scores on these five factors: IPIf1 (24.7%), IPIf2 (23.4%), IPIf3 (37.3%), IPIf4 (21.9%), and IPIf6 (24.1%). These results were found statistically significant and warranted a deeper investigation into variations in instructional perspectives based on exposure to adult learning theories, methods, and/or instructional strategies.

Variations in Instructional Perspectives Based on Exposure. Are there variations in instructional perspectives among faculty members of similar MBTI types teaching in same academic disciplines that might be related to exposure to adult learning theories, methods, and/or instructional strategies? Are there variations in instructional perspectives among faculty members of similar MBTI types teaching in same academic disciplines? If so, are these differences related to exposure to adult learning theories, methods, and/or instructional strategies? Insight into this subsequent research question was made possible by conducting a series of ANOVAs as well as factorial MANOVAs.

Looking within each Instructional Discipline separately, a one way analysis of variance between groups was conducted drawing on MBTI Temperament as an independent variable with the IPI total score serving as the dependent variable. Statistically significant differences in Education were found between these groups: NFs & NTs (.047) and NFs & SPs (.036). Statistically significant differences in Medical Sciences were found between these groups: NFs & SJs (.010) and NFs & SPs (.008). Statistically significant differences in Social Sciences were found between these groups: NFs & SJs (.006) and NTs & SJs (.000). These results demonstrate that variations in instructional perspectives among faculty members of similar MBTI types teaching in same academic disciplines do exist.

Moving deeper into the investigation to explore, "Are these differences related to exposure to adult learning theories, methods, and/or instructional strategies?", a factorial MANOVA for each MBTI temperament was conducted. Instructional discipline and level of exposure served as the independent variables and the seven factors of the Modified IPI served as dependent variables. With regard to Sensation-Judgers, exposure instructional strategies accounted for 20.3% of the variation in mean scores on Teacher Empathy with Learners (IPIf1); however, the impact was not as great on iNtuitive-Feelers (11.1%), iNtuitive-Thinkers (8.9%), or Sensation-Perceivers (3.8%). Exposure to instructional strategies explained 21.2% of variation in mean scores for Teacher Trust of Learners (IPIf2) of iNtuitive-Feelers with less impact on the other temperaments: SJs (11.2%), NTs (7.7%), and SPs (0.5%). Planning & Delivery of Instruction (IPIf3) was influenced by exposure at the following rates: SJs (26.1%), NTs (19.3%), NFs (14.1%), and SPs (9.5%). Percent of variation in mean scores for Accommodating Learner Uniqueness (IPIf4) is as follows: NFs (15.6%), SJs (14.3%), NTs (9.9%), and SPs (0.9%). The remaining results explain the percent of variation in mean scores for Learner-Centered Learning Process (IPIf6): NFs (27%), SPs (26.4%), NTs (16.4%), and SJs (11.3%).

These findings provide documented evidence that variations in instructional perspectives among faculty members of similar MBTI types teaching in same academic disciplines do exist and that exposure to adult learning theories, methods, and/or instructional strategies accounts for a significant proportion of the variation in mean scores. While certain natural abilities lead to a predisposal for a gift in teaching, this research supports the assertion that the successful deployment of instructional strategies and methodologies combines a set of learned skills that can be developed and honed over time. Seldin's (1994) assertion is justified, "Potentially great teachers become great teachers by the same route: through conditioning mind, through acquiring skills, and through practicing amidst intense competition" (p. 1).

Research Contributions

Light, Cox, and Calkins (2009) write about the post-millennium storm, fed by increasing calls for accountability and excellence, fuelled by globalization, and accelerated by the forces of commercial exchange sweeping across higher education. As higher education weathers this pervasive onslaught, the search for practical new paradigms in every discipline is urgent. Vella (2008) challenges educators to employ quantum thinking (looking at the world in a new way) and dialogue to evoke optimal learning. Knowledge of type coupled with a clear understanding of how learning and teaching styles influence student learning enables faculty to identify the modes in which students learn best (Provost & Anchors, 2003). This is useful in two ways: Helping students understand and become aware of how they themselves learn and study best (meta-cognition), and helping instructors, through exposure to adult learning theories, methods, and/or instructional strategies, achieve a more holistic approach to selecting and designing teaching strategies that accentuate their personal strengths, introduce variety in lesson planning, and incorporate activities that maximize student learning and understanding.

The demands as well as the complexity of the demands made on faculty are escalating exponentially (Light, Cox & Calkins, 2009). Bain (2004) insists that in order "to create a new kind of professor who understands the discipline and how it might be learned, we must change the way we develop young scholars and support the existing ones" (p. 177). As faculty members face greater and greater pressure to be critically reflective in their instructional practices, research investigating the link between the psychological type and instructional perspectives offers insight for examining differences and promoting dialogue on ways faculty can draw on and grow their collective strengths and abilities as they become more responsive to the needs of students of all types. By fully engaging in the process of continued development, faculty present themselves as models and mentors to incoming scholars, perpetuating a rise toward excellence.

In many ways, this research report, as a whole, serves as a wake up call to higher education. In light of an increase in books and publications aimed at increasing awareness in the academic community (Bain, 2004; Bok, 2006; Forsyth, 2003; Gappa, Austin & Trice, 2007; Light, Cox & Calkins, 2009; Silverman & Casazza, 2000; Vella, 2002; Weimer, 2002), an updated literary review reveals a myriad of publications with titles such as, *Higher Education? How Colleges are Wasting Our Money and Failing Our Kids – and What We Can Do about It* by A. Hacker and C. Dreifus (2010) and *No Sucker Left Behind: Avoiding the Great College Rip-Off* by M. Scheer (2008) aimed at the general public. The cry for increased accountability and demonstrable outcomes is mounting. Scheer (2008) makes some startling assertions, "too many students receive a disappointing college payoff, paying high prices, and borrowing large amounts of money in exchange for low-quality instruction and low starting salaries" (p. 1). The community at large is increasingly savvy regarding the disparities found in higher education.

Research demonstrates that colleges across the country are using an increasing number of contingent employees, part-time adjunct instructors, as well as graduate and undergraduate teaching assistant, to teach their courses (Hacker & Dreifus, 2010; Scheer, 2008). To the average tax payer working to stretch a meager income while setting aside money for college tuition and the student taking out loans and increasing debt ratio, this pattern of relying on contingents can appear as "yet another bait-and-switch trick that allows colleges to increase their profits" (Scheer, 2008, p. 73). Allegations that part-time faculty have a negative impact on quality does not correspond well with the research findings of Gappa and Leslie (1993). The good news is that many contingents place a high priority on teaching and perform well. Findings from this research indicate that adjunct instructors held the highest mean scores on the overall IPI total as well as the highest mean scores on six of the seven factors: IPIf1: Teacher Empathy with Learners, IPIf2: Teacher Trust of Learners, IPIf3: Planning & Delivery of Instruction,

IPIf4: Accommodating Learner Uniqueness, IPIf5: Teacher Insensitivity Toward Learners, IPIf6: Learner-Centered Learning Process. Adjuncts were followed by non-tenured faculty, while the lowest means came from Tenured Faculty and Graduate Teaching Assistants. While part-time faculty vary widely in their teaching performance, successful adjunct instructors with specialized training and extensive work experiences offer linkages to community resources that would be difficult to cultivate (Hacker & Dreifus, 2010; Gappa, Austin & Trice, 2007; Gappa & Leslie, 1993; Hacker & Dreifus, 2010; Lyons, 2009; Scheer, 2008).

Jarvis-Selinger, Collins, and Pratt (2007) assert that studying within a discipline, especially to a level commensurate with an undergraduate or graduate degree, is a form of enculturation into ways of thinking, forms of knowledge, and normative roles for both teachers and learners. Vega and Tayler (2005) claim that "because most professors are not experts in pedagogy, they tend to emulate the traditional transmission model in which they themselves were trained, where the instructor is the center of attention" (p. 83). Vega and Tayler (2005) go on to say that "this dilemma is particularly acute in the content-laden college classroom" (p. 83). Across the instructional disciplines, there were significant differences in the mean scores of the overall Modified Instructional Perspectives Inventory produced by Education and three other instructional disciplines: Engineering, Mathematics & Computer Science, and Natural Sciences. Faculty in Education and Communication & Fine Arts achieved the highest mean scores while faculty in Natural Sciences, Mathematics & Computer Science, and Engineering received the lowest scores, respectively. These findings provide documented evidence that variations in instructional perspectives among faculty members of similar MBTI types teaching in same academic disciplines do exist and that exposure to adult learning theories, methods, and/or instructional strategies accounts for a significant proportion of the variation in mean scores.

The Instructional Perspectives Inventory, first validated by Henschke in 1989 and then modified and re-validated by Stanton in 2005, provides an important measurement tool for adult educators to reflect on and benchmark instructional practices. This study confirmed the reliability of the Modified IPI. Findings from this study provided insight into the application and use of this instrument as a baseline measurement for improving instruction and aiding in the development of faculty. Research utilizing this instrument has been conducted with a range of adult educators teaching in a variety of settings (Henschke, 1989, 1994, 1998; Stanton, 2005), parent educators (Seward, 1997; Thomas, 1995), secondary teachers and principals (Stricker, 2006), nurse educators (Dawson, 1997; Drinkard, 2003; Rowbatham, 2007), math educators (McManus, 2007), and foreign language educators (Ryan, 2009), however, this research study is the most comprehensive use of the Modified Instructional Perspectives Inventory across the academic disciplines within the university setting. This systemic approach adds to exposure of this tool as an available resource for educators, while providing greater insight into the use of this tool by instructors in higher education to reflect on and benchmark instructional practices.

Extensive research has been done on the Myers-Briggs Type Indicator. The MBTI has received widespread use by consultants and researchers in the field of professional development (Walck, 1997). The Myers-Briggs has been compared to numerous instruments, such as the BarOn EQ-i on emotional intelligence, Felder and Silverman's Index of Learning Styles, the Kolb Learning Styles Inventory, the Kirton-Innovation Inventory, the Leadership Style Indicator. By adding the Modified Instructional Perspectives Inventory to the list, this study served to broaden this base of knowledge while providing faculty with the opportunity to gain greater insight into their own instructional styles and individual preferences. By understanding their own natural preferences, faculty members can choose work conditions and projects which support and enhance the development and expression of these preferences.

Practical Implications and Applications

Across the instructional disciplines, there were significant differences in the mean scores produced by Education and three other instructional disciplines: Engineering, Mathematics & Computer Science, and Natural Sciences. Faculty holding advance degrees in a particular content area may have little or no background or training in the art and science of facilitating learning. Beyond the necessity of content knowledge is the need for knowledge and understanding of adult learning theories, teaching methods, and instructional strategies. How is learning about content different than learning about methods for improving instruction and enhancing student performance and learning? Guyton and Dangel (2004) highlight research linking teacher preparation and student performance. Guyton and Dangel (2004) report that interventions focused on teaching teachers how to facilitate student decision-making and self-evaluation demonstrate a connection between the intervention and resulting change in teacher practice and hence student performance. Studies such as this confirm that exposure to theories, methodologies, and instructional strategies can improve instruction and positively impact student performance.

As visible diversity among college students in terms of age, gender, and ethnicity continues to increase, psychological type provides a way of examining important differences in choice of academic discipline(s), persistence, and instructional discipline as well as learning style and teaching style preferences. Different types learn in different ways. There has been extensive research linking the MBTI to other inventories, such as the BarOn EQ-i on emotional intelligence, Felder and Silverman's Index of Learning Styles, and the Kolb Learning Styles Inventory. The Center for Applications of Psychological Type (CAPT) houses an extensive library of on-going research, publications, applications, and uses of the Myers-Briggs Type Indicator. This study provides insight into psychological type as a predictor of instructional

perspectives. The knowledge and understanding of type theory provides an objective means for encouraging dialogue on improving instruction across the various disciplines. It may also serve as a guide for engaging in the process of critical reflection.

The MBTI is used across colleges and universities for a variety of purposes (Capretz, 2002; Moltz, 2008; Provost & Anchors, 1991, 2003; Shen, Prior, White & Karamanoglu, 2007). This study served to increase faculty exposure to the use of the Myers-Briggs Type Indicator in higher education. Using the Myers-Briggs Type Indicator to understand differences in learning styles, educators have worked to develop teaching methods that are responsive to the needs of different learners. Provost, Carson, and Beidler (2003) encourage the introduction of type theory early in the careers of faculty to facilitate their personal and professional growth, to increase awareness of biases about the best way to learn, and to encourage experimentation with a variety of teaching modes.

In their text, *Teaching Engineering*, Wankat and Oreovicz (1993) devote an entire chapter to "Psychological Type and Learning." Inspired by the MBTI, Capretz (2002) developed a range of practices for effective teaching and learning in software engineering courses with the aim of reaching every student, but in different ways, by devising various teaching approaches. In considering the importance of teamwork in all aspects of education and industry, Shen, Prior, White, and Karamanoglu (2007) argue for greater use of the MBTI when forming engineering design teams. Across the globe, the U.S. is continuing to lose ground in the development of young scholars specializing in math and sciences. Knowledge and understanding of the different approaches taken to enhance learning in these fields could be used to make similar inroads in Engineering, Mathematics & Computer Sciences, and the Natural sciences at the University of Missouri.

Research Limitations

This research study examined both MBTI temperament as well as whole type. Among practitioners, there is confusion regarding the overlap of the Myers-Briggs Type Indicator and the Keirsey Temperament Sorter. Keirsey's model of temperament is based on people's 'core needs' - having the need for freedom, to be useful, to be competent or to become. The Myers-Briggs or Jungian model of personality is based on cognitive functions: Sensing, Intuition, Feeling and Thinking, leading to 16 different personality types. When Keirsey formulated his questionnaire, he chose to report the same four letters as the Myers-Briggs Type Indicator - E-I, S-N, T-F and J-P. Keirsey (1984) asserts that there is a direct correspondence between temperament and four groups of four Myers Briggs personality types: Promethean (NT), Apollonian (NF), Epimethean (SJ), and Dionysian (SP). However, Jung (1923) made the following distinctions: Promethean (I--- types), Apollonian (I--- types), Epimethean (E--- types), and Dionysian (E--- types). The continued use of similar words or labels adds to the confusion. The inclusion of both temperament and whole type was intended to expand the body of research, adding viable insight into both temperament and type. Otto Kroeger Associates, an approved provider of the MBTI Certification Program, offers Myers-Briggs Type Indicator (MBTI) Introduction and Temperament Workbooks designed as complete training resources for type. Meanwhile the confusion and lack of clarification on the interaction of the two models causes some practitioners to exercise great caution in introducing and discussing temperament.

In comparison with the Myers-Briggs Type Indicator, the Modified Instructional Perspectives Inventory is a young instrument with limited research. As research on this instrument continues, it is being tested with different populations, for different purposes (Dawson, 1997; Drinkard, 2003; Henschke, 1989, 1994, 1998; McManus, 2007; Reinsch, 2007; Rowbatham, 2007; Ryan, 2009; Seward, 1997; Stanton, 2005; Stricker, 2006; Thomas, 1995;

Vatcharasirisook; 2011). As the purpose and use of this instrument is expanded, modifications are made. In the literature, it is referred to as the Instructional Perspectives Inventory, the IPI, the Modified Instructional Perspectives Inventory, Modified IPI, and the MIPI. To ensure consistency and clarity in research as well as the long-term integrity of this instrument, a systematic method for labeling and tracking research with this instrument is advised.

Given the constraints surrounding this research, a non-probability sample from one geographic region was utilized. Fortunately, it was a large sample, allowing for the testing of the primary research hypothesis across academic disciplines. In order to have confidence in a generalization, it is important that the sample be both large enough to yield statistical power as well as broad enough to include the diversity that represents this population. It is risky to make inferences and generalizations based on the results of one study. The findings from this research study warrant further exploration, opening the door for future research.

Recommendations for Future Research

Recommendations for future research were made on two levels: 1) Tactical Considerations – expand analysis on current data set, and 2) Strategic Considerations – extend the research to include additional colleges and universities, expanding the scope of the research.

Tactical Considerations. Pallant (2006) reports "logistic regression allows the researcher to test models to predict categorical outcomes with two or more categories" (p. 160). Utilized for the purpose of group prediction, logistic regression can be completed with two or more categorical or continuous independent variables, or a mix of both in one model (Pallant, 2006). Logistic regression provides the research tremendous flexibility. Mertler and Vanatta (2005) report "logistic regression requires no assumptions about the distributions of the predictor variables (IVs)" (p. 314) and "the predictors do not have to be normally distributed, linearly related, or have equal variances within each group" (p. 314).

In this study, the logistic regressions perched the four MBTI continuous scales as independent variables separately against each of the ten instructional disciplines dummy coded as dichotomous dependent variables. Overall, the results were non-significant. An attempt was made to conduct a series of logistic regressions using the four MBTI scales as well as MBTI temperament and whole type as independent variables with one dependent variable, known as instructional discipline, encoded as eleven different categories. An attempt to run the first set with the four MBTI scales against the one dependent variable, Instructional Discipline with eleven categories, resulted in an SPSS warning "The dependent variable has more than two non-missing values. For logistic regression, the dependent variable must assume exactly two values on the cases being processed." This effort failed to produce meaningful output; therefore, a decision was made to forego this endeavor. It went beyond the scope of the proposed analyses.

Mertler and Vannatta contend "logistic regression may be used to predict values on a DV of two or more categories" (p. 313). Although logistic regression, a complex technique, may be conducted with a dependent variable possessing more than two categories, most discussions on the graduate level are limited to binary logistic regression. Pallant (2006) confirms the Multinomial Logistic set of procedures is available in SPSS and it allows for the use of a dependent variable with more than two categories. This method allows the researcher to run the four MBTI dichotomous scales against instructional discipline with eleven different categories. Discriminant Analysis provides another alternative for working with a dependent variable with two or more categories; however, researchers are restricted to the use of quantitative IVs. The researcher recommends a discriminant analysis with the four MBTI scales (IV) against instructional discipline (one DV with eleven categories) and preferably a multinomial logistic regression with these same variables.

Strategic Considerations. This quantitative research study explores the relationship between the Myers-Briggs Type Indicator and instructional perspectives among faculty across academic disciplines at the University of Missouri's four campuses. Findings warrant further investigation; therefore, it is recommended that this research effort be expanded to include collection of data from other university systems as well as investigation into private colleges and universities and systemic exploration across community colleges. Researchers hope to make inferences about the populations. In order to have confidence in a generalization, it is important that the sample be both large enough to yield statistical power as well as broad enough to include the diversity that represents this population. Adding additional sample populations will allow the researcher to compare and contrast findings among differing institutions of higher learning as well as add confidence in making inferences and generalizations based on the research.

While findings demonstrated statistically significant differences in the mean scores of the overall IPI and the seven IPI factors based on MBTI temperaments, MBTI types, campus, instructional disciplines, teaching status and gender, these scores fell within the average range according to the scale produced by Stanton (2005). Average? What does this say about the institution? . . . the instruments? . . . the rating scale? The researcher recommends further study.

Summary and Conclusions

Education has the opportunity to play an integral role in sustaining the health of our economy. Stokes (2006) postulates that in order for higher education institutions to effectively mobilize and meet the real education needs of an increasingly competitive, global market economy, it is first necessary to recognize the diverse faces of higher education. A review of the issues and trends impacting higher education in Chapter Two reveals growing pressure placed on faculty to advance instructional outcomes among increasingly diverse populations. Imbedded is the challenge to create new knowledge about how to improve instruction.

Gappa, Austin, and Trice (2007) contend "In order to work creatively and effectively in a rapidly changing context, faculty must engage in continuous learning so as to constantly expand their repertoires of talents and skills" (p. 20). Professional development provides an avenue for strengthening the quality of teaching, research, and outreach (Gappa, Austin & Trice, 2007). Vibrant faculty members who are engaged in continuous learning and exploration of new ideas serve as positive models of intellectual engagement for students, staff, and their professorial peers, promoting productivity, morale, and creativity across the organization. Silverman and Casazza (2000) allege that to "remain vibrant and enthusiastic, educators must engage in a continuous quest for refining and improving the teaching and learning process" (p. 57).

This research investigating the link between the psychological type and instructional perspectives as well as its investigation into MBTI types and temperaments and instructional perspectives both across and within academic disciplines provided insight for examining differences and promoting dialogue on ways higher education institutions can become more responsive to the needs of both students and faculty of all types.

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Appendix A

Academic Disciplines

Business & Industry
- Accounting
- Advertising
- Business Administration
- Business & Management Systems
- Business Statistics
- Enterprise Management
- Entrepreneurship
- Finance
- Global Leadership
- Hotel & Restaurant Management
- Human Resource Development
- Management Information Systems
- International Business
- Logistics & Supply Chain Management
- Management
- Marketing
- Operations Management
- Organizational Development & Training
- Organizational Psychology
- Parks, Recreation, & Tourism
- Personal Finance Planning
- Transportation
- Travel

Communication & Fine Arts
- Agricultural Journalism
- Art & Crafts
- Art Education
- Communication
- Communication Science & Disorders
- Convergence Journalism
- Creative Writing
- Dance
- Drawing
- Film & Media Arts
- Film Studies
- Fine Arts
- Graphic Arts
- Interpersonal Communication
- Journalism
- Magazine Journalism
- Mass Communication
- Media Studies
- Music Education
- Music – Performance
- Music – Theory
- Music Therapy
- Newspaper Journalism
- Painting
- Photo Journalism
- Photography
- Printmaking
- Radio TV Journalism
- Sculpture
- Studio Art
- Textile & Apparel Management
- Theatre – Design & Technology
- Theatre - Performance

Education
- Adult & Continuing Education
- Agricultural Education
- Counseling Psychology
- Community Counseling
- Curriculum & Instruction
- Early Childhood Education
- Educational Administration
- Educational Leadership & Policy

Education
- Educational Psychology
- Educational Research & Evaluation
- Educational Research - Statistics
- Elementary Education
- Elementary School Counseling
- Higher Education
- Information Sciences & Learning Tech
- Learning, Teaching & Curriculum
- Middle School Education
- Physical Education
- School Psychology
- Secondary Education
- Secondary School Counseling
- Special Education
- Teaching & Learning

Engineering
- Aerospace Engineering
- Architectural Engineering
- Ceramic Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Electrical & Computer Engineering
- Engineering Management
- Environmental Engineering
- Geological Engineering
- Mechanical Engineering
- Metallurgical Engineering
- Mining Engineering
- Nuclear Engineering
- Petroleum Engineering
- Structural Engineering

Humanities
- American Studies
- Anthropology
- Archeology
- Architectural Studies
- Art History
- Classical Studies
- English
- English Language & Literature
- Foreign Languages & Literatures
- French
- Geography
- German Studies
- Global Studies
- History
- Italian
- Linguistics
- Literature
- Mandarin
- Philosophy
- Portuguese
- Religious Studies
- Romance Languages & Literatures
- Russian Studies
- Spanish

Mathematics & Computer Science
- Applied Mathematics
- Computer Science
- Information Science & Technology
- Mathematics
- Operations Research
- Programming
- Statistics

Medical Sciences
- Anesthesiology & Perioperative Medicine
- Biomedical Sciences
- Cardiopulmonary & Diagnostic Sciences
- Child Health
- Dental Hygiene
- Dentistry
- Dermatology
- Family & Community Medicine
- Food Science
- Gerontology
- Health Management & Informatics
- Health Psychology
- Internal Medicine
- Medical Pharmacology & Physiology
- Medical Research - Statistics
- Molecular Microbiology & Immunology
- Neurology
- Nursing
- Nutritional Sciences
- Obstetrics & Gynecology
- Occupational Therapy
- Ophthalmology
- Optometry
- Orthopaedic Surgery
- Otolaryngology – Head Neck
- Pathology & Anatomical Sciences
- Physical Medicine & Rehabilitation
- Physiological Optics
- Physical Therapy
- Radiology
- Surgery

Natural Sciences
- Agricultural Systems Management
- Agronomy
- Anatomical Sciences
- Animal Sciences
- Astronomy
- Atmospheric Sciences
- Biochemistry
- Bioinformatics
- Biological Engineering
- Biological Sciences
- Biotechnology
- Chemical Engineering
- Chemistry
- Entomology
- Environmental Sciences
- Equestrian Science
- Fisheries & Wildlife
- Food Systems & Bioengineering
- Forestry
- Geological Sciences
- Geophysics
- Geosciences
- Horticulture
- Microbiology
- Molecular Biology
- Natural Resources
- Plant Microbiology & Pathology
- Plant Sciences
- Physics
- Soil Sciences
- Veterinary Medicine & Surgery
- Veterinary Pathobiology
- Zoology

Social Sciences – Next Page

Social Sciences
Applied Social Sciences
Agricultural Economics
Criminology
Criminal Justice
Economics
Human Development & Family Studies
Human Environmental Sciences
Law
Military Science & Leadership
Multiculturalism & Diversity
Naval Science
Political Science
Psychiatry
Psychological Sciences
Public Affairs
Public Health
Public Policy Administration
Public Policy Research - Statistics
Rural Sociology
Social Work
Sociology
Urban Studies
Urban Planning & Design
Women's & Gender Studies

Appendix B

Research Invitation

Would you like to win one of 4 -$100 or 4 -$50 gift certificates to Amazon.com ?

Would you consider spending **less than 30 minutes** to help a determined doctoral candidate advance research into the factors which influence faculty development while learning more about your own preferences?

You are invited to participate in a research project entitled, **Exploring the Relationship between Myers-Briggs Type and Instructional Perspectives among College Faculty across Academic Disciplines**. The purpose of this research is to investigate the role personality plays in predicting instructional perspectives. **Attached you will find a copy of the Informed Consent** which provides project details.

Through online survey, you will be asked to complete three instruments:

1. The Myers-Briggs Type Indicator (MBTI);

2. The Modified Instructional Perspectives Inventory; and

3. A Brief Demographic Survey.

Please complete all three instruments in one sitting.

When completing the demographic survey**, please refer to the attached list of academic disciplines.** Note: It is not unusual for academic programs to fall into different disciplines/departments/schools/colleges depending on the UM campus with which you serve. To ensure continuity across the four UM campuses, please base your responses as the information is organized on this list.

Now to earn your chance to win one of 8-gift certificates to Amazon.com, simply click on the link provided below.

Login: **UMfaculty**

Password: **2010data**

User ID: (Please leave this field blank.)

https://online.cpp.com

By clicking on the survey link, you agree to give consent to participate in the research study and will be directed to the MBTI online research site. Please note that this particular software functions best using Internet Explorer.

Upon completion of the MBTI, an 11 digit UserID will be generated. **Please note this UserID.** You should then be automatically redirected to the next instrument. Some respondents using Mozilla Firefox have experienced an interruption.

If the program fails to redirect you to the second survey site, please click on the following link to complete the survey and enter into the random prize drawing: http://skylight.wsu.edu/s/a38367b5-0f5d-40ba-8859-494b12fc6c88.srv

Your contribution to this research project is greatly appreciated!

Pamela Moehl
(636) 456-0969
moehlp@umsl.edu

Appendix C

Division of Educational Leadership & Policy Studies

One University Blvd.
St. Louis, Missouri 63121-4499
Telephone: 314-516-5944
E-mail: moehlp@umsl.edu

Informed Consent for Participation in Research Activities

Exploring the Relationship between Myers-Briggs Type and Instructional Perspectives Among College Faculty across Academic Disciplines

HSC Approval Number: 100414M

Principal Investigator: Pamela J. Moehl PI's Phone Number: 636-456-0969

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1. You are invited to participate in an online research study conducted by Pamela J. Moehl and Dr. Lloyd Richardson. The purpose of this research is to investigate the role personality plays in predicting instructional perspectives.

2. a) Your participation will involve completing the Myers-Briggs Type Indicator (MBTI), the Modified Instructional Perspectives Inventory (IPI), and a brief demographic survey. You may participate in the study at a time most convenient to you.

   Data will be collected from faculty teaching across academic disciplines at public colleges located in the same Midwestern state. Approximately 300 subjects are expected to participate in this research.

   b) Your participation in this research study will require approximately 30 minutes.

3. There are no anticipated risks associated with this research. All data will remain anonymous and will be kept on a password-protected computer. Data from the MBTI will be managed by Consulting Psychologist Press (CPP). Those respondents who elect to provide an email address will receive an automated report containing the results of their MBTI. Researchers will receive anonymous data sets, identifiable only by the 11 digit UserID. Data from the Modified IPI and the brief demographic survey will be housed in Skylight Matrix Survey System. Data sets will be linked together utilizing the 11 digit UserID. No personal identifiers will be retained.

4. In addition to helping to expand the knowledge base concerning factors that contribute to faculty development and receiving an automated interpretive report of your results, you will

receive an invitation to participate in a workshop highlighting each instrument and its application and use in higher education. As additional incentive for participating in this research, you may enter your name and email into a random prize drawing to win one of 4-$100 or 4-$50 gift cards to Amazon.com.

5. Your participation is voluntary. **By clicking on the survey link, you agree to give consent to participate in the research study and will be directed to the MBTI online research site**.

   Once you have completed the MBTI (http://online.cpp.com), an 11 digit UserID number will be generated. Please note this UserID as you will be asked to re-enter this number later in the survey.

   Respondents will be automatically redirected to a secondary website where you will be asked to complete the Modified-IPI and respond to a brief demographic survey (http://skylight.wsu.edu/s/a38367b5-0f5d-40ba-8859-494b12fc6c88.srv).

   Please note that by stopping during the completion of the Modified IPI and brief demographic survey, your results will not be stored. It is not possible to log in and out of the survey. **These instruments must be completed in one sitting. You may elect to withdraw consent by stopping and/or you may refrain from responding to a particular question by simply skipping that question**.

   Once you have completed the study, you will be directed to a final site where you may opt to provide contact information in the random prize drawing for one of 4-$100 or 4-$50 gift cards to Amazon.com. This information is stored in a separate database and cannot be linked with survey responses. **Survey responses will remain anonymous.**

6. By agreeing to participate, you understand and agree that your data may be shared with other researchers and educators in the form of presentations and/or publications. In all cases, your identity will remain anonymous.

7. If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, Pamela J. Moehl at 636-456-0969 or the Faculty Advisor, Dr. Lloyd Richardson at 314-516-5095. You may also ask questions or state concerns regarding your rights as a research participant to the Office of Research Administration, at 314-516-5897.

I have read this consent form. By clicking on the survey link, I consent to my participation in the research described above.

Appendix D

Myers-Briggs Type Indicator

Sample Questions – Step I™ (Form M)

Part I Which answer comes closest to describing how you usually feel or act?

When you go somewhere for the day, would you rather
- □ plan what you will do and when, or
- □ just go?

If you were a teacher, would you rather teach
- □ fact courses, or
- □ courses involving theory?

Do you usually get along better with
- □ imaginative people, or
- □ realistic people?

Does following a schedule
- □ appeal to you, or
- □ cramp you?

Would most people say you are
- □ a private person, or
- □ a very open person?

Are you inclined to
- □ value sentiment more than logic, or
- □ value logic more than sentiment?

Do you find being around a lot of people
- □ gives you more energy, or
- □ is often "draining"?

Part II Which word in each pair appeals to you more?

□ abstract	□ imaginative
□ solid	□ matter-of-fact
□ systematic	□ build
□ casual	□ invent
□ reserved	□ theory
□ talkative	□ fact
□ compassion	□ quiet
□ foresight	□ gregarious

Part III Which answer comes closest to describing how you usually feel or act?

When you start a big project that is due in a week, do you
- □ take time to list the separate things to be done and the order of doing them, or
- □ Plunge right in?

In doing something that many other people do, does it appeal to you more to
- □ do it in the accepted way, or
- □ invent a new way of your own?

Do you generally prefer course that teach
- □ concepts and principles, or
- □ facts and figures?

Which is a higher complement, to be called
- □ competent, or
- □ compassionate?

Overall, when working on a big assignment, do you tend to
- □ figure out what needs to be done as you go along, or
- □ begin by breaking it down into steps?

Would you rather work under a boss (or teacher) who is
- □ good-natured but often inconsistent, or
- □ sharp-tongued but always logical?

Part IV Which word in each pair appeals to you more?

□ production	□ imaginative
□ design	□ matter-of-fact
□ possibilities	□ devoted
□ certainties	□ determined
□ tenderness	□ practical
□ strength	□ innovative
□ novel	□ competent
□ already known	□ kindhearted

Appendix E

MODIFIED INSTRUCTIONAL PERSPECTIVES INVENTORY

Listed below are 45 statements reflecting beliefs, feelings, and behaviors beginning or seasoned teachers of adults may or may not possess at a given moment. Please indicate how frequently each statement typically applies to you as you work with adult learners. Circle the number that best describes you.

	How frequently do you:	Almost Never	Not Often	Sometimes	Usually	Almost Always
1.	Use a variety of teaching techniques?	A	B	C	D	E
2.	Use buzz groups (learners placed in groups to discuss information from lectures)?	A	B	C	D	E
3.	Believe that your primary goal is to provide learners as much information as possible?	A	B	C	D	E
4.	Feel fully prepared to teach?	A	B	C	D	E
5.	Have difficulty understanding learner point-of-views?	A	B	C	D	E
6.	Expect and accept learner frustration as they grapple with problems?	A	B	C	D	E
7.	Purposefully communicate to learners that each is uniquely important?	A	B	C	D	E
8.	Express confidence that learners will develop the skills they need?	A	B	C	D	E
9.	Search for or create new teaching?	A	B	C	D	E
10.	Teach through simulations of real-life?	A	B	C	D	E
11.	Teach exactly what and how you have planned?	A	B	C	D	E
12.	Notice and acknowledge to learners positive changes in them?	A	B	C	D	E
13.	Have difficulty getting your point across to learners?	A	B	C	D	E

	How frequently do you:	Almost Never	Not Often	Sometimes	Usually	Almost Always
14.	Believe that learners vary in the way they acquire, process, and apply subject matter knowledge?	A	B	C	D	E
15.	Really listen to what learners have to say?	A	B	C	D	E
16.	Trust learners to know what their own goals, dreams, and realities are like?	A	B	C	D	E
17.	Encourage learners to solicit assistance from other learners?	A	B	C	D	E
18.	Feel impatient with learner's progress?	A	B	C	D	E
19.	Balance your efforts between learner content acquisition and motivation?	A	B	C	D	E
20.	Try to make your presentations clear enough to forestall all learner questions?	A	B	C	D	E
21.	Conduct group discussions?	A	B	C	D	E
22.	Establish instructional objectives?	A	B	C	D	E
23.	Use a variety of instructional media? (internet, distance, interactive video, videos, etc.)	A	B	C	D	E
24.	Use listening teams (learners grouped together to listen for a specific purpose) during lectures?	A	B	C	D	E
25.	Believe that your teaching skills are as refined as they can be?	A	B	C	D	E
26.	Express appreciation to learners who actively participate?	A	B	C	D	E
27.	Experience frustration with learner apathy?	A	B	C	D	E
28.	Prize the learner's ability to learn what is needed?	A	B	C	D	E
29.	Feel learners need to be aware of and communicate their thoughts and feelings?	A	B	C	D	E
30.	Enable learners to evaluate their own progress in learning?	A	B	C	D	E

	How frequently do you:	Almost Never	Not Often	Sometimes	Usually	Almost Always
31.	Hear what learners indicate their learning needs are?	A	B	C	D	E
32.	Have difficulty with the amount of time learners need to grasp various concepts?	A	B	C	D	E
33.	Promote positive self-esteem in learners?	A	B	C	D	E
34.	Require learners to follow the precise learning experiences you provide them?	A	B	C	D	E
35.	Conduct role plays?	A	B	C	D	E
36.	Get bored with the many questions learners ask?	A	B	C	D	E
37.	Individualize the pace of learning for each learner?	A	B	C	D	E
38	Help learners explore their own abilities?	A	B	C	D	E
39.	Engage learners in clarifying their own aspirations?	A	B	C	D	E
40.	Ask the learners how they would approach a learning task?	A	B	C	D	E
41.	Feel irritation at learner inattentiveness in the learning setting?	A	B	C	D	E
42.	Integrate teaching techniques with subject matter content?	A	B	C	D	E
43.	Develop supportive relationships with your learners?	A	B	C	D	E
44.	Experience unconditional positive regard for your learners?	A	B	C	D	E
45.	Respect the dignity and integrity of the learners?	A	B	C	D	E

INSTRUCTIONAL PERSPECTIVES INVENTORY
FACTORS

(1)	(2)	(3)	(4)	(5)	(6)	(7)
4 ____	7 ____	1 ____	6 ____	5 ____	2 ____	3 ____
12 ____	8 ____	9 ____	14 ____	13 ____	10 ____	11 ____
19 ____	16 ____	22 ____	15 ____	18 ____	21 ____	20 ____
26 ____	28 ____	23 ____	17 ____	27 ____	24 ____	25 ____
33 ____	29 ____	42 ____	37 ____	32 ____	35 ____	34 ____
	30 ____		38 ____	36 ____		
	31 ____		40 ____	41 ____		
	39 ____					
	43 ____					
	44 ____					
	45 ____					
TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL

Scoring process

A = 1, B = 2, C = 3, D = 4, and E = 5

Reversed scored items are 3, 5, 11, 13, 18, 20, 25, 27, 32, 34, 36, and 41. These reversed items are scored as follows: A = 5, B = 4, C = 3, D= 2, and E = 1.

FACTORS	MEAN	TOTAL	POSSIBLE MINIMUM	POSSIBLE MAXIMUM
	(Stanton, 2005 p. 361)			
1. Teacher empathy with learners.	_____	= _____	5	25
2. Teacher trust of learners.	_____	= _____	11	55
3. Planning and delivery of instruction.	_____	= _____	5	25
4. Accommodating learner uniqueness.	_____	= _____	7	35
5. Teacher insensitivity toward learners.	_____	= _____	7	35
6. Experience based learning techniques (Learner-centered learning process).	_____	= _____	5	25
7. Teacher-centered learning process.	_____	= _____	5	25

Appendix F

Demographic Survey

Gender: ○ Male ○ Female

UM Campus: ○ MS&T ○ UMC ○ UMKC ○ UMSL

Academic Discipline Associated with Instruction (Please check all that apply.):

○ Business & Industry ○ Communication & Fine Arts ○ Education
○ Engineering ○ Humanities ○ Mathematics & Computer Science
○ Medical Sciences ○ Natural Sciences ○ Social Sciences

 # Years Teaching: _____

Employment Status: ○ Part-time ○ Full-time

Teaching Status: ○ Tenure Track ○ Non-Tenure Track ○ Adjunct Instructor ○ Graduate Assistant

Degrees Earned: ○ Associate ○ Bachelor ○ Master ○ Post-Graduate ○ Doctorate ○ Other _____

Academic Discipline(s) Associated with Your Area(s) of Concentration in Graduate School:

○ Business & Industry ○ Communication & Fine Arts ○ Education
○ Engineering ○ Humanities ○ Mathematics & Computer Science
○ Medical Sciences ○ Natural Sciences ○ Social Sciences

Academic Discipline(s) Associated with Your Undergraduate Major(s):

○ Business & Industry ○ Communication & Fine Arts ○ Education
○ Engineering ○ Humanities ○ Mathematics & Computer Science
○ Medical Sciences ○ Natural Sciences ○ Social Sciences

Academic Discipline(s) Associated with Your Undergraduate Minor(s):

○ Business & Industry ○ Communication & Fine Arts ○ Education
○ Engineering ○ Humanities ○ Mathematics & Computer Science
○ Medical Sciences ○ Natural Sciences ○ Social Sciences

Exposure to Adult Learning Theories, Teaching Methods, and/or Instructional Strategies:

○ No Exposure ○ Mild Exposure ○ Moderate Exposure ○ High Exposure

Sources of Exposure to Adult Learning Theories, Teaching Methods, and/or Instructional Strategies:

○ Undergraduate Coursework ○ Graduate Coursework ○ Conferences ○ Professional Journals
○ Mentoring ○ Professional Development Programs ○ Teaching & Learning Center ○ Mentoring
○ Other: _____

Appendix G

OFFICE OF RESEARCH ADMINISTRATION

Interdepartmental Correspondence

Name: Pamela Moehl

Title: Exploring the Relationship between Myers-Briggs Type and Instructional Perspectives among College Faculty Across Academic Disciplines

The chairperson of the Human Subjects Committee for UM-St. Louis has reviewed the above mentioned protocol for research involving human subjects and determined that the project qualifies for exemption from full committee review under Title 45 Code of Federal Regulations Part 46.101b. The time period for this approval expires one year from the date listed below. You must notify the Human Subjects Committee in advance of any proposed major changes in your approved protocol, e.g., addition of research sites or research instruments.

You must file an annual report with the committee. This report must indicate the starting date of the project and the number of subjects to date from start of project, or since last annual report, whichever is more recent.

Any consent or assent forms must be signed in duplicate and a copy provided to the subject. The principal investigator must retain the other copy of the signed consent form for at least three years following the completion of the research activity and they must be available for inspection if there is an official review of the UM-St. Louis human subjects research proceedings by the U.S. Department of Health and Human Services Office for Protection from Research Risks.

This action is officially recorded in the minutes of the committee.

Protocol Number	Date	Signature - Chair
100414M	4/15/10	

Appendix H

From: andermansh@umkc.edu [mailto:andermansh@umkc.edu]
Sent: Wed 6/9/2010 4:49 PM
To: Moehl, Pamela Jean (UMSL-Student)
Cc: Anderman, Sheila H.; Anderman, Sheila H.; Richardson Jr, Lloyd I.
Subject: Study 100417: Exploring the Relationship between Myers-Briggs Type and Instructional Perspectives among College Faculty across Academic Disciplines

June 9, 2010

Pamela Moehl
UMSL - Educational Leadership & Policy Studies
24106 Great Warrior Ridge
Warrenton, MO 63383

Dear Investigator:

Your research protocol IRB #100417 entitled, "Exploring the relationship between Myers-Briggs Type and Instructional Perspectives Among College Faculty Across Disciplines" was reviewed by a Board Member of the UMKC Social Sciences Institutional Review Board and classified as exempt in accordance with exemption criteria #2 in the Federal Guidelines 45 CFR Part 46 as follows: "Research involving the use of educational test (cognitive, diagnostic, achievement), survey procedures, interview procedures or observation of public behavior, unless: (1) information obtained is recorded in such a manner that subjects can be identified, directly or through identifiers linked to the subjects and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or
be damaging to the subjects' financial standing employability, or reputation.

Reapproval is also required and you are asked to submit a progress report before 6/7/11if your project continues beyond this date. If your project is terminated earlier, a final report to the Review Board is required within 90 days.

Sincerely,

Sheila Anderman, CIP, CIM
Research Protections Program Manager
UMKC Social Sciences
Institutional Review Board

This e-mail is an official notification intended only for the use of the recipient(s). This letter indicates the status of the UMKC Social Sciences IRB review of the referenced research project. When appropriate, a member of the UMKC Social Sciences IRB staff will be contacting the recipient(s) informing them of other IRB documents related to this project that are available to either 1) be picked up at the IRB office - 5319 Rockhill Road or 2) be mailed via campus mail or postal service - i.e.; revisions to consent form, advertisements, etc. If a signed copy of this letter is needed, please contact a member of the IRB staff. If you have received this communication in error, please return it to the sender immediately and delete any copy of it from your computer system.

Appendix I

July 23, 2010

Christie Geha
Compliance Specialist
University of Missouri - Columbia
Office of Research - Campus IRB

Dear Ms. Geha:

As a PhD candidate at UMSL, I am attempting to collect research from faculty across the four UM campuses. Each campus has a separate IRB process/application and requires different human subjects training. I first submitted the online UMC IRB Application and completed the CITI Human Research Participants Training in March, 2010. I have continued to follow-up electronically and/or verbally each month.

On 6/29/10, I received an electronic purge notification from UMC.

Project Title: Exploring the Relationship between Myers-Briggs Type and Instructional Perspectives among College Faculty across Academic Disciplines

Summary: This quantitative research study will explore the relationship between the Myers-Briggs Type Indicator and instructional perspectives among university faculty across academic disciplines. Primarily it sets out to investigate the role psychological type, as measured by the Myers-Briggs Type Indicator (MBTI), plays in predicting instructional perspectives, as measured by the Modified Instructional Perspectives Inventory (Modified-IPI).

Rationale for Proposed Research: Jarvis-Selinger, Collins, & Pratt (2007) boldly state "factors that influence the process of a teacher's development are only partially understood" (p.1). As faculty members face greater and greater pressure to be critically reflective in their instructional practices, research investigating the link between the psychological type and instructional perspectives offers insight for examining differences and promoting dialogue on ways higher education institutions can become more responsive to the needs of students of all types.

Methodology: The sample population will include faculty teaching across academic disciplines at public colleges located in the same Midwestern state. Full-time, part-time, and adjunct faculty at all four UM campuses will receive an email inviting them to participate in the research study. The student researcher is in the process of submitting IRB applications to each of the four campuses. Results will be analyzed across academic disciplines rather than institutions; therefore, the goal is to obtain a minimum of 225 and ideally 300 responses. Instrumentation includes a brief demographic survey, the MBTI, and the Modified-IPI. Research subjects will receive an invitation to participate in an online survey. This electronic invitation will include a link to the MBTI website. The MBTI site will be set up through and overseen by Consulting Psychologist Press (CPP). Upon completion of the MBTI, participants will be automatically directed to secondary website containing a brief demographic survey as well as the Modified-IPI. This secondary site will be set up through Flashlight. Upon completion of the survey, participants will receive an automated interpretive report of results of the MBTI.

Election to participate in the survey constitutes informed consent. Research subjects maintain the freedom to withdraw consent at any time as well as the freedom to refrain from answering any questions without penalty. All research data will be free of any personal identification and sorted with an alphanumeric code ensuring anonymity among research subjects.

Attached you will find a copy of written notication of UMSL IRB approval and my original IRB application. In addition, I have obtained IRB approval from UMKC and Dr. Moss assures me that my IRB approval from Missouri S&T is forthcoming.

Please contact me at (636) 456-0969 to notify me of any additional action required on my part. Your assistance in this matter is greatly appreciated!

Pamela J. Moehl

From: Geha, Christie Ann
Sent: Mon 7/26/2010 9:03 AM
To: Moehl, Pamela Jean (UMSL-Student)
Subject: RE: UMC IRB Application # 1162898 - Pamela Moehl

Hello,

You do not need someone from UMC to be listed on this project. In fact, if there is no one from this institution that will be engaged in this project, the project does not need to come to the UMC Campus IRB.

Please confirm that you will not have anyone from UMC engaged in this project. This includes, the collection or analysis of data.

Thank you,

Christie Geha
Compliance Specialist
Campus Institutional Review Board
University of Missouri
484 McReynolds Hall
573-884-9372

From: Moehl, Pamela Jean (UMSL-Student)
Sent: Wednesday, July 28, 2010 2:52 PM
To: Geha, Christie Ann
Cc: Richardson Jr, Lloyd I.
Subject: RE: UMC IRB Application # 1162898 - Pamela Moehl

Christie,

Again, your assistance is greatly appreciated. I would like to include UMC faculty in the invitation to participate in the study. Does this require UMC campus IRB?

Thanks,

Pam

-----Original Message-----
From: Geha, Christie Ann
Sent: Wed 7/28/2010 2:56 PM
To: Moehl, Pamela Jean (UMSL-Student)
Subject: RE: UMC IRB Application # 1162898 - Pamela Moehl

No, this would not require IRB approval from us. It only requires UMC IRB approval if someone from UMC is engaged in the study (i.e data collection or data analysis).

Thank you,

Christie Geha
Compliance Specialist
Campus Institutional Review Board
University of Missouri
484 McReynolds Hall
573-884-9372

Appendix J

Campus Institutional Review Board Approval Form
Missouri University of Science and Technology

This is to certify that the research proposal entitled:

Exploring the Relationship between Myers-Briggs Type and Instructional Perspectives among College Faculty across Academic Disciplines

Submitted by: **Pamela J. Moehl**
Department: **UMSL COE Educational Leadership & Policy Studies**

has been reviewed by the Campus IRB and approved with respect to the study of human subjects as appropriately protecting the rights and welfare of the individuals involved.

Type of Approval: ___X___Exempt _____Expedited _____Full

Approval Date: August 11, 2010 Expiration Date: August 10, 2011

Note that approval of this research is contingent upon the following agreement by the researcher(s):

1) To report potentially serious events to the Campus IRB by the most expeditious means within five days of occurrence. The IRB may require an additional written report.
2) To submit a **Change in IRB Approval Form UMRIRB-2***, if the project changes in any way that affects human subjects.
3) To maintain copies of all pertinent information, including copies of informed consent agreements, for a period of three years from the date of completion of the research.
4) To adhere to all UMR Policies and Procedures relating to human subjects, as written in accordance with 45 Code of Federal Regulations 46.
5) To be aware that Federal and University Regulations require continuing review of research projects involving human subjects. Therefore, **this approval will expire one year from date of approval.** To meet this requirement, **Continuing Review Report UMRIRB-4* should be filed within one year of the original approval date.** However, projects receiving Exempt Approval and lasting less than one year do not need to provide this report. The campus IRB reserves the right, at any point, to inspect project records to ensure compliance with federal regulations.

*See http://www.umr.edu/~irb/forms.html for the necessary forms.

Approved By: Randy H. Moss Title: Chair, Missouri S&T IRB

Randy H. Moss Date: August 11, 2010

Appendix K

Pamela J. Moehl

24106 Great Warrior Ridge; Warrenton, MO 63383
Home: (636) 456-0969 Cell: (314) 402-5409 pamelamoehl@centurytel.net

EXPERIENCE

FREE-LANCE CONSULTANT — JANUARY 91 - PRESENT

ORGANIZATIONAL DEVELOPMENT & TRAINING

- Provide organizational development and training services on a contractual basis. A partial list of clients includes CareerTrack Seminars, the Cramer Institute, East Central College, Progress Bank, St. Charles Community College, and the University of Missouri.
- Complete organizational assessments, make recommendations regarding appropriate interventions, oversee the design and implementation of organizational development and training projects, evaluate the effectiveness of programs, and provide follow-up.
- Specialize in programs designed to improve knowledge and skill in the following areas: Career Development, Conflict Resolution, Continuous Quality Improvement, Interpersonal Communications, Leadership Development, Organizational Change, Personal Enrichment, Problem Solving, Team Building, and Sales.

UNIVERSITY OF MISSOURI - ST. LOUIS — MAY 94 - OCTOBER 98

SPECIALIST - ORGANIZATIONAL DEVELOPMENT & TRAINING

- Spearheaded activities under a $1.4 million technology grant to develop and implement integrated enrollment, advising, and retention systems at UMSL. This effort resulted in improved service to students, faculty, and staff across the University of Missouri System.
- Diagnosed process, technological, and human resource related issues; made recommendations regarding appropriate interventions; facilitated continuous quality improvement efforts; oversaw the design and implementation of organizational interventions; upgraded systems and technology; designed communication releases and publications; developed and delivered training; and completed necessary evaluation, follow-up, and governmental reporting.

MCDONNELL DOUGLAS CORPORATION — MARCH 89 - MAY 93

SENIOR SPECIALIST - STAFF DEVELOPMENT (MDAIS)

- Managed organizational development and training projects from initial request and customer contact through needs identification, design, implementation, evaluation and follow-up.
- Played the lead role in curriculum planning for McDonnell Douglas Aerospace Information Services (MDAIS) including leadership development, total quality management, career planning, sales, and communications.
- Interfaced directly with and provided coaching to all levels of the organization including senior executives and facilitated strategic planning and team building sessions.
- Led a team of quality specialists in the development of TQM courseware and facilitation of process improvement teams to reduce cycle times across the company.

- Conducted train the trainer activities designed to aid new trainers in developing the skills necessary to successfully analyze, design, deliver, and evaluate training interventions.
- Delivered courses designed to improve leadership, sales, and communication skills within the MDAIS - instructor evaluations consistently averaged 4.94 on a 5-point scale.

MCDONNELL DOUGLAS CORPORATION

SPECIALIST - HUMAN RESOURCE DEVELOPMENT (MISSILE SYSTEMS)

- Managed training projects from initial request through analysis, design, delivery, and evaluation of training.
- Enhanced new employee orientation programs and communication courseware.
- Supported outplacement activities by providing career counseling, assisting individuals in networking activities, as well as teaching resume writing and job interviewing courses.
- Supported the development of improved supplier relationships through training on enhancing supplier relationships, performance measurement systems, on-site supplier certifications and assessments.

UNIVERSITY OF MISSOURI - COLUMBIA **AUGUST 88 - MARCH 89**

GRADUATE ASSISTANT - MARKETING EDUCATION

- Assisted in the coordination and evaluation of student interns on site at area companies.
- Assisted in the development of a criterion referenced test bank for marketing educators.

CITICORP MORTGAGE, INC. **SEPTEMBER 86 - JUNE 88**

TRAINING SPECIALIST

- Developed and delivered corporate training programs.
- Assessed individual participants and evaluated the overall effectiveness of training.
- Redesigned existing courses to increase skill development and enhance transfer of learning - in one program the average post-test score increased from 67% to 98%.

TRAINING COORDINATOR

- Designed a marketing campaign to increase enrollment into computer-based training programs - within 4 months training rose from 25 hours to 700 hours per month.
- Scheduled course offerings; coordinated enrollments; oversaw computer-based training; compiled and distributed MIS reporting.

EDUCATION

PH.D. IN EDUCATION
Educational Leadership & Policy Studies
University of Missouri - St. Louis
August 2011

MASTER'S OF EDUCATION
Organizational Development & Training
University of Missouri - Columbia
May 1990

B.S. DEGREE IN BUSINESS ADMINISTRATION
Emphasis: Management & Marketing
Central Missouri State University
December 1985

ASSOCIATE OF APPLIED SCIENCE
Emphasis: Business Management
East Central College
May 1984

CERTIFICATIONS

Administration and Interpretation of the Myers-Briggs Type Indicator
Design and Development of Criterion Referenced Instruction
Master Trainer of Zenger-Miller's Frontline Leadership series and Working series

PUBLICATIONS

Beeler, K. J. & Moehl, P.J. (1996). Continuous Improvement: A Way of Integrating Student Enrollment, Advising, and Retention Systems in a Metropolitan University. In K.J. Beeler (Ed.), Metropolitan Universities: An International Forum. 6(4), 17-33.

CONFERENCE PRESENTATIONS, PANELS, & SYMPOSIA

Moehl, P.J. (1998). Presenter. Focus on the Future: A Personal and Professional Enrichment Series for Administrators, Faculty, and Staff. 1998 Professional Development Series sponsored by the Chancellor, University of Missouri - St. Louis.

Beeler, K.J., Moehl, P.J., & Kellam, M. (1997). Planning Student Information Systems for the New Century. 1997 joint national conference of the American College Personnel Association and the National Association of Student Personnel Administrators – Chicago.

Beeler, K.J. & Moehl, P.J. (1996). Taking Charge of Change: Empowering the Organization for Renewal. 1996 regional conference of the National Association of Student Personnel Administrators – Hot Springs.

Beeler, K. J. & Moehl, P.J. (1996). Continuous improvement: A way of Integrating Student Enrollment, Advising, and Retention through Visioning and Cross-Functional Teamwork. 1996 annual conference of the National Association of Student Personnel Administrators – Atlanta.

Beeler, K. J. & Moehl, P.J. (1996). Using Continuous Improvement Methods to Transform the Learning Environment. 1996 annual conference of the National Association of Student Personnel Administrators – Atlanta.

Appendix L

mbti.

Myers-Briggs Type Indicator®
Profile

JANE SAMPLE / ENFP
October 28, 2009

This profile is designed to help you understand your results on the *Myers-Briggs Type Indicator®* (MBTI®) assessment. Based on your individual responses, the MBTI instrument produces results to identify which of sixteen different personality types best describes you. Your personality type represents your preferences in four separate categories, with each category composed of two opposite poles. The four categories describe key areas that combine to form the basis of a person's personality as follows:

- **Where you focus your attention—Extraversion (E) or Introversion (I)**
- **The way you take in information—Sensing (S) or Intuition (N)**
- **The way you make decisions—Thinking (T) or Feeling (F)**
- **How you deal with the outer world—Judging (J) or Perceiving (P)**

Your MBTI type is indicated by the four letters representing your preferences. Based on your responses to the assessment, your reported MBTI type is ENFP, also described as Extraverted Intuition with Feeling. Your results are highlighted below.

Reported Type: ENFP

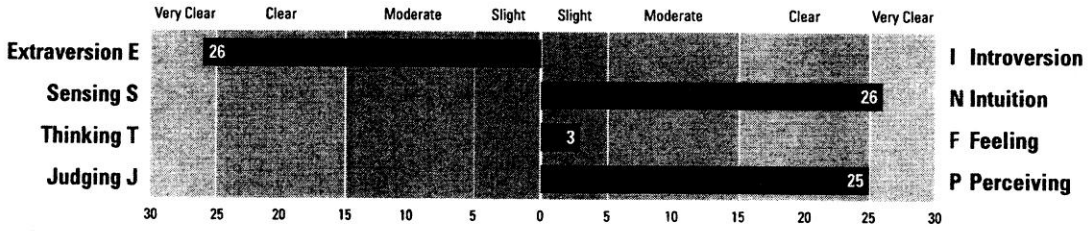
Where you focus your attention	**E**	**Extraversion** People who prefer Extraversion tend to focus their attention on the outer world of people and things.	**I**	**Introversion** People who prefer Introversion tend to focus their attention on the inner world of ideas and impressions.
The way you take in information	**S**	**Sensing** People who prefer Sensing tend to take in information through the five senses and focus on the here and now.	**N**	**Intuition** People who prefer Intuition tend to take in information from patterns and the big picture and focus on future possibilities.
The way you make decisions	**T**	**Thinking** People who prefer Thinking tend to make decisions based primarily on logic and on objective analysis of cause and effect.	**F**	**Feeling** People who prefer Feeling tend to make decisions based primarily on values and on subjective evaluation of person-centered concerns.
How you deal with the outer world	**J**	**Judging** People who prefer Judging tend to like a planned and organized approach to life and prefer to have things settled.	**P**	**Perceiving** People who prefer Perceiving tend to like a flexible and spontaneous approach to life and prefer to keep their options open.

Your responses to the MBTI assessment not only indicate your preferences; they also indicate the relative *clarity* of your preferences—that is, how clear you were in expressing your preference for a particular pole over its opposite. This is known as the *preference clarity index,* or pci. The bar graph that follows charts your pci results. Note that a longer bar suggests you are quite sure about your preference, while a shorter bar suggests you are less sure about that preference.

Myers-Briggs Type Indicator®
Profile

JANE SAMPLE / ENFP
October 28, 2009

Clarity of Reported Preferences: ENFP



PCI Results **Extraversion 26** **Intuition 26** **Feeling 3** **Perceiving 25**

Your type professional can give you more insight into your profile results as well as elaborate on the type description provided for you in the chart below. Does the description of your reported type seem to fit you? Many people find that their MBTI results describe them quite well. For others, changing a letter or two may help them discover an MBTI type that more accurately captures their personality. If you feel the characteristics do not fit you quite right, the person who administered the MBTI instrument can help you identify a better-fitting type.

Type Description: ENFP

ISTJ	ISFJ	INFJ	INTJ
ISTP	ISFP	INFP	INTP
ESTP	ESFP	**ENFP**	ENTP
ESTJ	ESFJ	ENFJ	ENTJ

- Curious, creative, and imaginative
- Energetic, enthusiastic, and spontaneous
- Keenly perceptive of people and of the world around them
- Appreciative of affirmation from others; readily express appreciation and give support to others
- Likely to value harmony and goodwill
- Likely to make decisions based on personal values and empathy with others
- Usually seen by others as personable, perceptive, persuasive, and versatile

Each type, or combination of preferences, tends to be characterized by its own interests, values, and unique gifts. Whatever your preferences, you may use some behaviors that are characteristic of contrasting preferences. For a more complete discussion of the sixteen types, see the *Introduction to Type®* booklet by Isabel Briggs Myers. This publication and many others to help you understand your personality type are available from CPP, Inc.

Appendix M

Reliability – Cronbach Alpha

Scale: Modified Instructional Perspectives Inventory

Reliability Statistics

Cronbach's Alpha	N of Items
.900	45

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IPI Item 1	157.4019	307.135	.599	.895
IPI Item 2	158.8217	307.578	.383	.898
IPI Item 3	158.6496	325.750	-.010	.904
IPI Item 4	157.3149	318.944	.226	.900
IPI Item 5	157.5586	316.159	.349	.898
IPI Item 6	157.3737	315.758	.356	.898
IPI Item 7	157.6952	302.478	.582	.895
IPI Item 8	157.0765	310.710	.561	.896
IPI Item 9	157.5775	306.109	.590	.895
IPI Item 10	157.5876	308.263	.450	.897
IPI Item 11	158.8583	323.840	.064	.902
IPI Item 12	157.3738	307.743	.598	.896
IPI Item 13	157.5954	317.389	.325	.899
IPI Item 14	156.8819	315.396	.393	.898
IPI Item 15	157.1295	313.185	.507	.897
IPI Item 16	157.5148	314.636	.356	.898
IPI Item 17	157.2389	315.404	.348	.898
IPI Item 18	157.8348	315.974	.340	.899
IPI Item 19	157.9114	312.642	.437	.897
IPI Item 20	158.8784	327.646	-.061	.904
IPI Item 21	157.6999	304.863	.513	.896
IPI Item 22	157.3525	312.296	.398	.898
IPI Item 23	157.6889	307.659	.442	.897
IPI Item 24	159.5936	314.942	.286	.899
IPI Item 25	157.4913	331.715	-.172	.906
IPI Item 26	157.0971	311.892	.480	.897
IPI Item 27	158.4446	320.976	.136	.901

IPI Item 28	157.4050	314.004	.410	.898
IPI Item 29	157.4919	307.355	.538	.896
IPI Item 30	157.7116	309.888	.478	.897
IPI Item 31	157.6756	306.520	.614	.895
IPI Item 32	157.8725	316.781	.301	.899
IPI Item 33	157.4043	305.871	.597	.895
IPI Item 34	158.1412	321.517	.114	.902
IPI Item 35	159.1166	307.609	.407	.898
IPI Item 36	157.0199	319.573	.222	.900
IPI Item 37	158.5995	308.448	.467	.897
IPI Item 38	157.7590	304.454	.636	.895
IPI Item 39	157.9104	303.569	.611	.895
IPI Item 40	158.2583	307.955	.466	.897
IPI Item 41	158.1928	316.590	.246	.900
IPI Item 42	157.4254	308.187	.575	.896
IPI Item 43	157.2815	307.436	.649	.895
IPI Item 44	157.8725	308.452	.484	.897
IPI Item 45	156.8312	314.970	.479	.897

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
161.3548	326.444	18.06777	45

Reliability – Cronbach Alpha

Scale: Factor 1 - Teacher Empathy with Learners

Reliability Statistics

Cronbach's Alpha	N of Items
.697	5

Item Statistics

	Mean	Std. Deviation	N
IPI Item 4	4.0399	.84062	426
IPI Item 12	3.9810	.85660	426
IPI Item 19	3.4434	.84664	426
IPI Item 26	4.2577	.81877	426
IPI Item 33	3.9505	.94304	426

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IPI Item 4	15.6326	6.629	.247	.728
IPI Item 12	15.6915	5.356	.584	.591
IPI Item 19	16.2291	5.952	.420	.661
IPI Item 26	15.4148	5.797	.491	.633
IPI Item 33	15.7220	5.195	.540	.608

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
19.6725	8.404	2.89900	5

Reliability – Cronbach Alpha

Scale: Factor 2 - Teacher Trust of Learners

Reliability Statistics

Cronbach's Alpha	N of Items
.853	11

Item Statistics

	Mean	Std. Deviation	N
IPI Item 7	3.6596	1.12195	426
IPI Item 8	4.2783	.76568	426
IPI Item 16	3.8400	.87464	426
IPI Item 28	3.9498	.81160	426
IPI Item 29	3.8629	.96290	426
IPI Item 30	3.6432	.93276	426
IPI Item 31	3.6792	.88965	426
IPI Item 39	3.4444	1.02492	426
IPI Item 43	4.0733	.80692	426
IPI Item 44	3.4823	.99896	426
IPI Item 45	4.5236	.65036	426

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IPI Item 7	38.7770	31.237	.603	.836
IPI Item 8	38.1582	34.384	.566	.840
IPI Item 16	38.5965	35.231	.391	.852
IPI Item 28	38.4868	35.014	.456	.847
IPI Item 29	38.5737	32.843	.570	.839
IPI Item 30	38.7934	33.947	.482	.846
IPI Item 31	38.7573	33.016	.611	.836
IPI Item 39	38.9921	31.837	.620	.834
IPI Item 43	38.3633	33.311	.654	.833
IPI Item 44	38.9542	33.059	.522	.843
IPI Item 45	37.9130	35.610	.518	.844

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
42.4365	40.057	6.32902	11

Reliability – Cronbach Alpha

Scale: Factor 3 - Planning & Delivery of Instruction

Reliability Statistics

Cronbach's Alpha	N of Items
.753	5

Item Statistics

	Mean	Std. Deviation	N
IPI Item 1	3.9529	.88259	426
IPI Item 9	3.7773	.94191	426
IPI Item 22	4.0023	.94184	426
IPI Item 23	3.6659	1.12987	426
IPI Item 42	3.9294	.86756	426

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IPI Item 1	15.3749	7.737	.613	.678
IPI Item 9	15.5506	7.632	.578	.688
IPI Item 22	15.3255	8.474	.395	.752
IPI Item 23	15.6620	7.386	.466	.737
IPI Item 42	15.3985	7.936	.581	.690

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
19.3279	11.528	3.39524	5

Reliability – Cronbach Alpha

Scale: Factor 4 - Accommodating Learner Uniqueness

Reliability Statistics

Cronbach's Alpha	N of Items
.721	7

Item Statistics

	Mean	Std. Deviation	N
IPI Item 6	3.9811	.79387	426
IPI Item 14	4.4729	.75137	426
IPI Item 15	4.2254	.71020	426
IPI Item 17	4.1159	.83641	426
IPI Item 37	2.7553	1.03190	426
IPI Item 38	3.5958	.95038	426
IPI Item 40	3.0965	1.06168	426

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IPI Item 6	22.2617	11.771	.363	.704
IPI Item 14	21.7699	11.794	.392	.698
IPI Item 15	22.0175	11.630	.464	.685
IPI Item 17	22.1270	11.821	.323	.713
IPI Item 37	23.4875	10.330	.450	.685
IPI Item 38	22.6471	9.892	.600	.643
IPI Item 40	23.1464	10.153	.458	.684

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
26.2428	14.380	3.79203	7

Reliability – Cronbach Alpha

Scale: Factor 5 - Teacher Insensitivity toward Learners

Reliability Statistics

Cronbach's Alpha	N of Items
.704	7

Item Statistics

	Mean	Std. Deviation	N
IPI Item 5	3.7962	.77986	426
IPI Item 13	3.7594	.73479	426
IPI Item 18	3.5200	.81180	426
IPI Item 27	2.9102	.93882	426
IPI Item 32	3.4823	.83753	426
IPI Item 36	4.3349	.78881	426
IPI Item 41	3.1620	1.00800	426

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IPI Item 5	21.1688	10.095	.397	.675
IPI Item 13	21.2056	10.399	.365	.682
IPI Item 18	21.4450	9.400	.524	.642
IPI Item 27	22.0549	9.430	.409	.672
IPI Item 32	21.4827	9.540	.469	.656
IPI Item 36	20.6302	10.529	.296	.698
IPI Item 41	21.8031	8.977	.443	.664

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
24.9650	12.668	3.55928	7

Reliability – Cronbach Alpha

Scale: Factor 6 - Learner-Centered Learning Process

Reliability Statistics

Cronbach's Alpha	N of Items
.689	5

Item Statistics

	Mean	Std. Deviation	N
IPI Item 2	2.5331	1.28066	426
IPI Item 10	3.7673	1.07724	426
IPI Item 21	3.6549	1.13373	426
IPI Item 24	1.7612	1.02771	426
IPI Item 35	2.2382	1.21456	426

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IPI Item 2	11.4216	9.440	.467	.630
IPI Item 10	10.1875	11.122	.344	.679
IPI Item 21	10.2998	9.784	.520	.607
IPI Item 24	12.1935	10.955	.403	.657
IPI Item 35	11.7165	9.581	.492	.618

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
13.9548	14.755	3.84122	5

Reliability – Cronbach Alpha

Scale: Factor 7 - Teacher-Centered Learning Process

Reliability Statistics

Cronbach's Alpha	N of Items
.639	5

Item Statistics

	Mean	Std. Deviation	N
IPI Item 3	2.7052	1.04053	426
IPI Item 11	2.4965	.83136	426
IPI Item 20	2.4764	1.00559	426
IPI Item 25	3.8635	1.00362	426
IPI Item 34	3.2136	.97203	426

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IPI Item 3	12.0500	6.584	.379	.593
IPI Item 11	12.2588	7.196	.404	.584
IPI Item 20	12.2788	6.373	.454	.554
IPI Item 25	10.8917	6.753	.370	.597
IPI Item 34	11.5416	6.903	.361	.601

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
14.7553	9.691	3.11297	5

Appendix N

Pearson's Correlation (Total IPI & Seven IPI Factors - MBTI Scales)

		Continuous EI	Continuous SN	Continuous TF	Continuous JP	Total IPI Score
Total IPI Score	Pearson Correlation	-.294**	.258**	.243**	.107*	1
	Sig. (2-tailed)	.000	.000	.000	.028	
	N	426	426	426	426	426
IPI Factor 1	Pearson Correlation	-.226**	.171**	.147**	.052	.753**
	Sig. (2-tailed)	.000	.000	.002	.286	.000
	N	426	426	426	426	426
IPI Factor 2	Pearson Correlation	-.211**	.184**	.252**	.029	.874**
	Sig. (2-tailed)	.000	.000	.000	.555	.000
	N	426	426	426	426	426
IPI Factor 3	Pearson Correlation	-.245**	.163**	.132**	.046	.778**
	Sig. (2-tailed)	.000	.001	.006	.343	.000
	N	426	426	426	426	426
IPI Factor 4	Pearson Correlation	-.186**	.152**	.151**	.060	.803**
	Sig. (2-tailed)	.000	.002	.002	.213	.000
	N	426	426	426	426	426
IPI Factor 5	Pearson Correlation	-.174**	.160**	.132**	.077	.519**
	Sig. (2-tailed)	.000	.001	.006	.113	.000
	N	426	426	426	426	426
IPI Factor 6	Pearson Correlation	-.296**	.132**	.147**	.073	.689**
	Sig. (2-tailed)	.000	.007	.002	.133	.000
	N	426	426	426	426	426
IPI Factor 7	Pearson Correlation	-.010	.257**	.101*	.210**	.058
	Sig. (2-tailed)	.833	.000	.038	.000	.235
	N	426	426	426	426	426

Appendix O

Pearson's Correlation (Instructional Disciplines - Total IPI & Seven IPI Factors)

		Total IPI	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Business & Industry	Pearson Cor.	-.002	.001	-.014	.025	-.050	.035	-.009	.020
	Sig. (2-tailed)	.962	.981	.766	.610	.304	.477	.860	.683
	N	426	426	426	426	426	426	426	426
Communication & Arts	Pearson Cor.	.081	.131**	.125**	.056	.103*	.020	.047	-.169**
	Sig. (2-tailed)	.093	.007	.010	.250	.034	.679	.336	.000
	N	426	426	426	426	426	426	426	426
Education	Pearson Cor.	.231**	.069	.180**	.127**	.190**	.121*	.274**	.065
	Sig. (2-tailed)	.000	.153	.000	.009	.000	.012	.000	.178
	N	426	426	426	426	426	426	426	426
Engineering	Pearson Cor.	-.146**	-.121*	-.128**	-.086	-.092	-.054	-.155**	-.013
	Sig. (2-tailed)	.003	.012	.008	.077	.058	.264	.001	.792
	N	426	426	426	426	426	426	426	426
Humanities	Pearson Cor.	.071	.036	.032	.064	.063	.047	.080	.015
	Sig. (2-tailed)	.142	.456	.504	.190	.195	.328	.098	.761
	N	426	426	426	426	426	426	426	426
Mathematics & Com	Pearson Cor.	-.093	.022	-.064	-.099*	-.043	.024	-.187**	-.066
Science	Sig. (2-tailed)	.056	.651	.189	.042	.373	.627	.000	.175
	N	426	426	426	426	426	426	426	426
Medical Sciences	Pearson Cor.	.051	-.038	.070	.059	.044	-.027	.037	.057
	Sig. (2-tailed)	.293	.430	.152	.221	.368	.583	.445	.237
	N	426	426	426	426	426	426	426	426
Natural Sciences	Pearson Cor.	-.127**	-.025	-.115*	-.107*	-.069	-.062	-.200**	.041
	Sig. (2-tailed)	.009	.609	.017	.027	.157	.203	.000	.404
	N	426	426	426	426	426	426	426	426
Social Sciences	Pearson Cor.	.001	-.008	-.015	.055	-.094	-.003	.101*	-.022
	Sig. (2-tailed)	.978	.868	.760	.259	.053	.954	.037	.651
	N	426	426	426	426	426	426	426	426
Multiple Disciplines	Pearson Cor.	.085	.018	.076	.105*	.017	.084	.069	.005
	Sig. (2-tailed)	.081	.717	.119	.031	.721	.083	.154	.915
	N	426	426	426	426	426	426	426	426

Appendix P

Primary Research Question – Oneway ANOVAs

(MBTI Scales, MBTI Temperament, MBTI Type - IPI Total Score)

Oneway ANOVA: MBTI Temperament – IPI Total Score

Total IPI Score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Extravert	174	166.9033	15.61969	1.18413	164.5661	169.2405	103.00	202.00
Introvert	252	157.5237	18.66839	1.17600	155.2076	159.8398	93.00	212.52
Total	426	161.3548	18.06777	.87539	159.6342	163.0754	93.00	212.52

Test of Homogeneity of Variances

Total IPI Score

Levene Statistic	df1	df2	Sig.
4.254	1	424	.040

ANOVA

Total IPI Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9055.508	1	9055.508	29.607	.000
Within Groups	129683.303	424	305.857		
Total	138738.811	425			

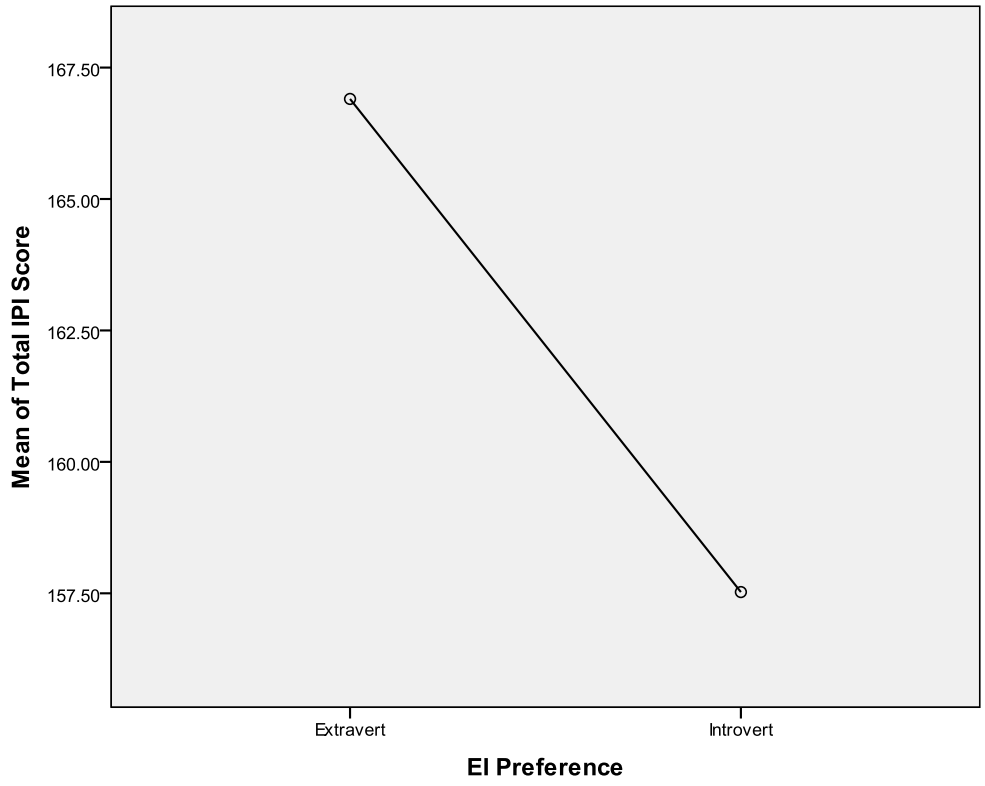
Robust Tests of Equality of Means

Total IPI Score

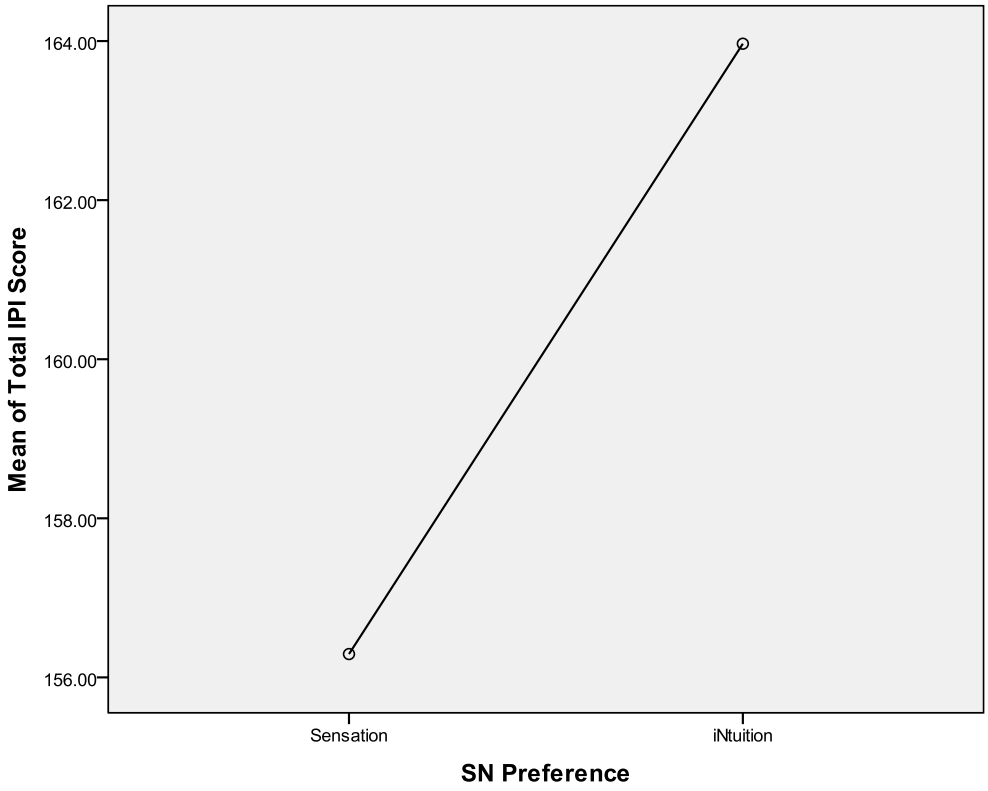
	Statistic[a]	df1	df2	Sig.
Welch	31.588	1	408.596	.000
Brown-Forsythe	31.588	1	408.596	.000

a. Asymptotically F distributed.

Mean Plot: Extraversion-Introversion – IPI Total Score



Mean Plot: Sensation-iNtuition – IPI Total Score



Oneway ANOVA: Sensation-iNtuition – IPI Total Score

Descriptives

Total IPI Score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Sensation	145	156.2934	18.51284	1.53741	153.2546	159.3322	106.00	205.00
iNtuition	281	163.9665	17.29524	1.03175	161.9356	165.9975	93.00	212.52
Total	426	161.3548	18.06777	.87539	159.6342	163.0754	93.00	212.52

Test of Homogeneity of Variances

Total IPI Score

Levene Statistic	df1	df2	Sig.
.794	1	424	.374

ANOVA

Total IPI Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5631.271	1	5631.271	17.938	.000
Within Groups	133107.540	424	313.933		
Total	138738.811	425			

Robust Tests of Equality of Means

Total IPI Score

	Statistic[a]	df1	df2	Sig.
Welch	17.175	1	274.301	.000
Brown-Forsythe	17.175	1	274.301	.000

a. Asymptotically F distributed.

Oneway ANOVA: Thinking-Feeling – IPI Total Score

Descriptives

Total IPI Score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Thinking	278	159.1567	17.92010	1.07478	157.0410	161.2725	93.00	207.00
Feeling	148	165.4836	17.67423	1.45281	162.6126	168.3547	103.00	212.52
Total	426	161.3548	18.06777	.87539	159.6342	163.0754	93.00	212.52

Test of Homogeneity of Variances

Total IPI Score

Levene Statistic	df1	df2	Sig.
.022	1	424	.883

ANOVA

Total IPI Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3866.178	1	3866.178	12.154	.001
Within Groups	134872.632	424	318.096		
Total	138738.811	425			

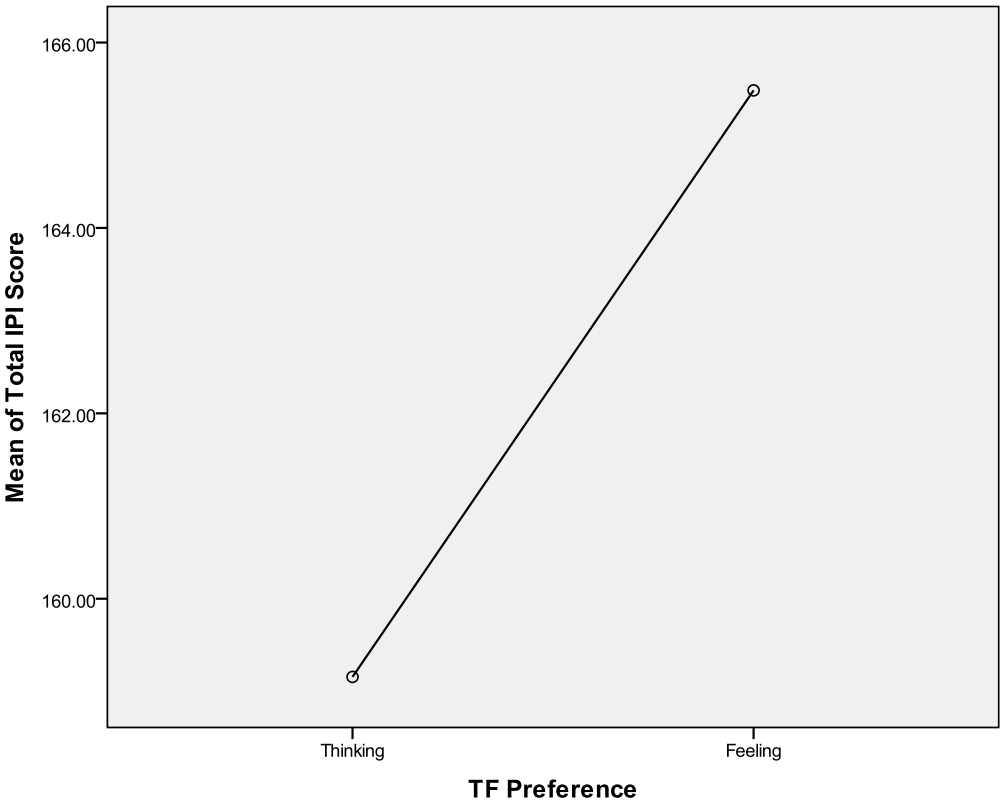
Robust Tests of Equality of Means

Total IPI Score

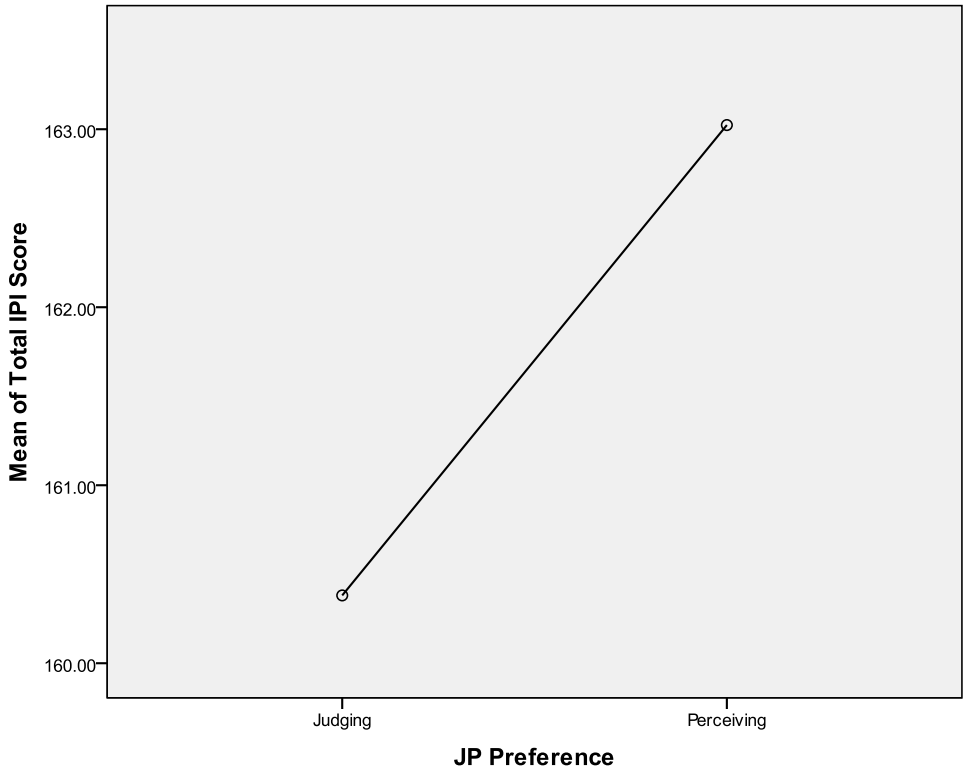
	Statistic[a]	df1	df2	Sig.
Welch	12.257	1	303.664	.001
Brown-Forsythe	12.257	1	303.664	.001

a. Asymptotically F distributed.

Mean Plot: Thinking-Feeling – IPI Total Score



Mean Plot: Judging-Perceiving – IPI Total Score



Oneway ANOVA: Judging-Perceiving – IPI Total Score

Descriptives

Total IPI Score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Judging	269	160.3810	17.63051	1.07495	158.2646	162.4974	106.00	207.00
Perceiving	157	163.0233	18.73275	1.49504	160.0702	165.9764	93.00	212.52
Total	426	161.3548	18.06777	.87539	159.6342	163.0754	93.00	212.52

Test of Homogeneity of Variances

Total IPI Score

Levene Statistic	df1	df2	Sig.
.176	1	424	.675

ANOVA

Total IPI Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	692.165	1	692.165	2.126	.146
Within Groups	138046.646	424	325.582		
Total	138738.811	425			

Robust Tests of Equality of Means

Total IPI Score

	Statistic[a]	df1	df2	Sig.
Welch	2.059	1	310.661	.152
Brown-Forsythe	2.059	1	310.661	.152

a. Asymptotically F distributed.

Oneway ANOVA: MBTI Temperament – IPI Total Score

Descriptives

Total IPI Score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
NT	163	161.1758	16.78959	1.31506	158.5790	163.7727	93.00	207.00
NF	118	167.8215	17.31208	1.59371	164.6653	170.9778	103.00	212.52
SJ	113	157.3259	19.00140	1.78750	153.7842	160.8676	106.00	205.00
SP	32	152.6475	16.43034	2.90450	146.7237	158.5713	117.00	195.00
Total	426	161.3548	18.06777	.87539	159.6342	163.0754	93.00	212.52

Test of Homogeneity of Variances

Total IPI Score

Levene Statistic	df1	df2	Sig.
1.186	3	422	.315

ANOVA

Total IPI Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9200.148	3	3066.716	9.990	.000
Within Groups	129538.662	422	306.964		
Total	138738.811	425			

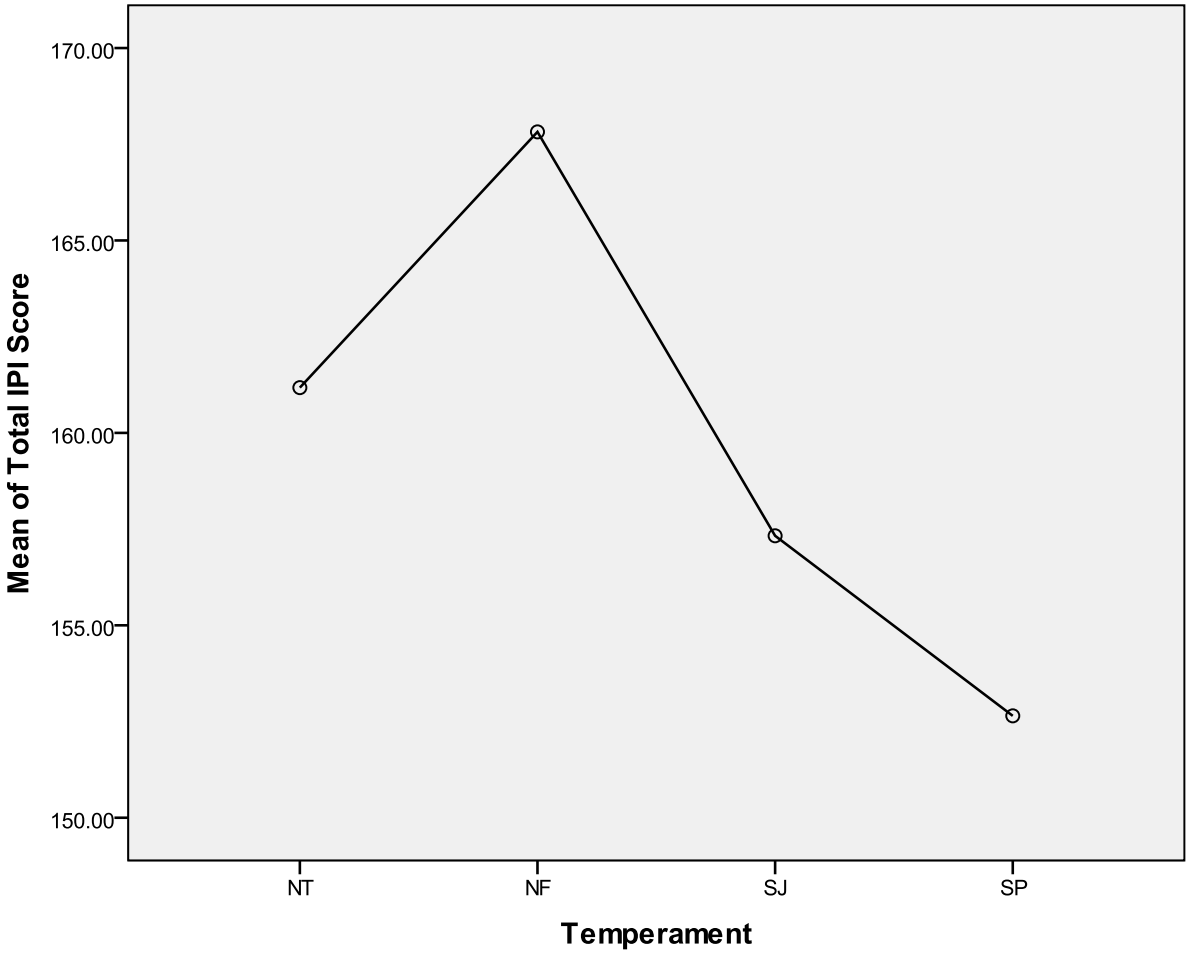
Robust Tests of Equality of Means

Total IPI Score

	Statistic[a]	df1	df2	Sig.
Welch	10.073	3	128.245	.000
Brown-Forsythe	10.158	3	254.142	.000

a. Asymptotically F distributed.

Mean Plot: MBTI Temperament – IPI Total Score



Oneway ANOVA: MBTI Whole Type – IPI Total Score

Total IPI Score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
ISTJ	61	154.5708	20.92208	2.67880	149.2124	159.9292	106.00	205.00
ISFJ	16	152.4150	18.63849	4.65962	142.4833	162.3467	120.00	181.00
INFJ	35	162.5351	16.41418	2.77450	156.8967	168.1736	127.00	190.00
INTJ	59	158.9605	16.32577	2.12543	154.7060	163.2150	132.00	207.00
ISTP	16	146.0413	17.59262	4.39815	136.6668	155.4157	117.00	176.34
ISFP	6	153.1667	5.45588	2.22736	147.4411	158.8923	147.00	159.00
INFP	23	166.8665	20.03897	4.17841	158.2010	175.5320	135.00	212.52
INTP	36	157.4311	18.18490	3.03082	151.2782	163.5840	93.00	185.98
ESTP	8	162.5075	15.29791	5.40863	149.7181	175.2969	140.00	195.00
ESFP	2	164.5000	13.43503	9.50000	43.7911	285.2089	155.00	174.00
ENFP	38	173.3734	16.53557	2.68242	167.9383	178.8085	103.00	198.00
ENTP	28	164.8679	15.83768	2.99304	158.7266	171.0091	129.00	202.00
ESTJ	30	163.6123	13.59138	2.48144	158.5372	168.6874	139.00	195.00
ESFJ	6	167.0000	14.21267	5.80230	152.0847	181.9153	151.00	182.00
ENFJ	22	167.6405	15.09216	3.21766	160.9490	174.3319	139.00	192.00
ENTJ	40	165.2293	16.03486	2.53533	160.1011	170.3574	135.00	199.77
Total	426	161.3548	18.06777	.87539	159.6342	163.0754	93.00	212.52

Test of Homogeneity of Variances

Total IPI Score

Levene Statistic	df1	df2	Sig.
1.242	15	410	.237

ANOVA

Total IPI Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17559.114	15	1170.608	3.961	.000
Within Groups	121179.696	410	295.560		
Total	138738.811	425			

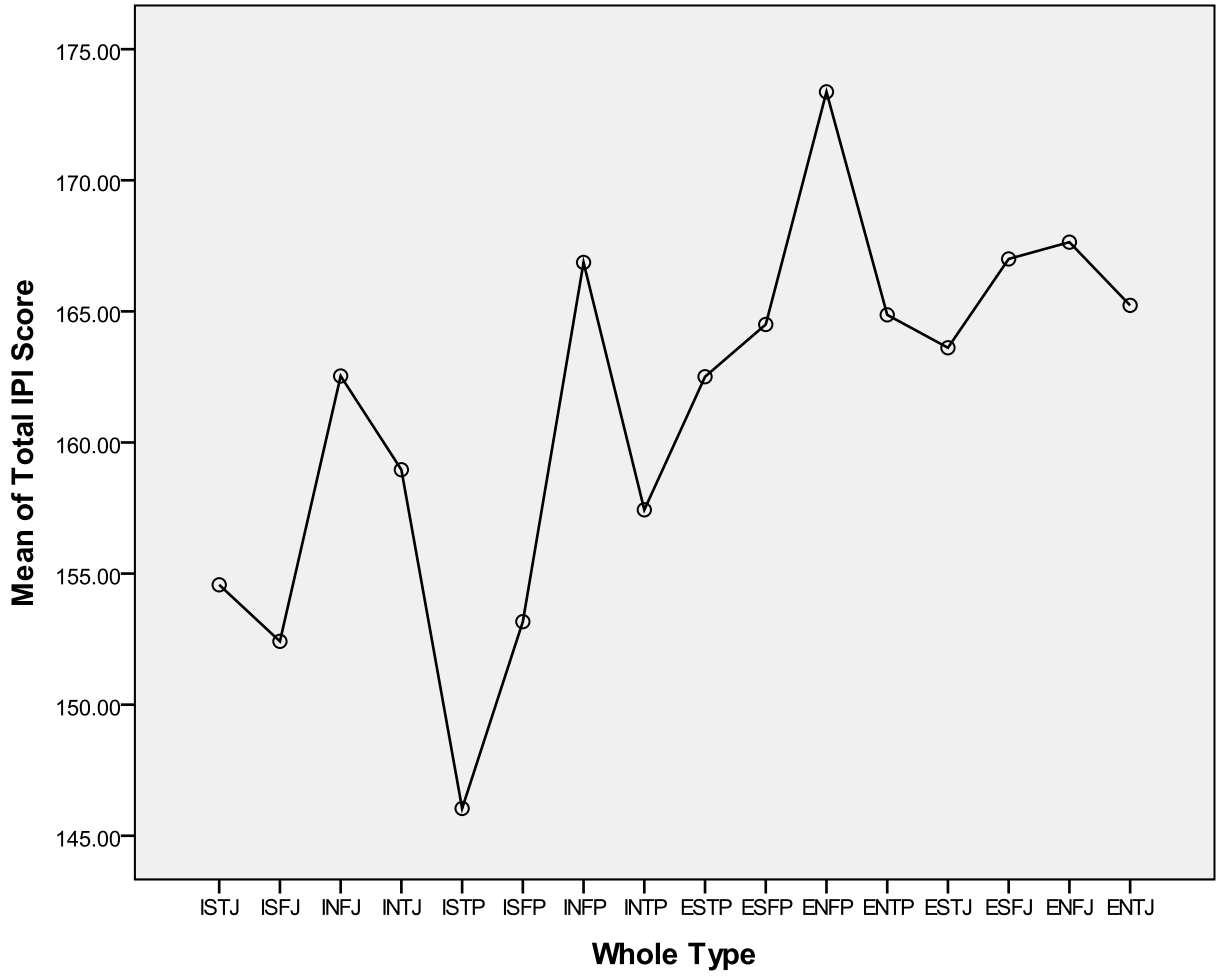
Robust Tests of Equality of Means

Total IPI Score

	Statistic[a]	df1	df2	Sig.
Welch	3.875	15	45.585	.000
Brown-Forsythe	4.492	15	182.200	.000

a. Asymptotically F distributed.

Mean Plot – MBTI Whole Type – IPI Total Score



Appendix Q

Primary Research Question – Factorial MANOVA

(MBTI Scales – Seven IPI Factors)

Between-Subjects Factors

		Value Label	N
EI Preference	1	Extravert	174
	2	Introvert	252
SN Preference	1	Sensation	145
	2	iNtuition	281
TF Preference	1	Thinking	278
	2	Feeling	148
JP Preference	1	Judging	269
	2	Perceiving	157

Box's Test of Equality of Covariance Matrices[a]

Box's M	504.692
F	1.299
df1	336
df2	21644.885
Sig.	.000

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + EI + SN + TF + JP + EI * SN + EI * TF + EI * JP + SN * TF + SN * JP + TF * JP + EI * SN * TF + EI * SN * JP + EI * TF * JP + SN * TF * JP + EI * SN * TF * JP

Multivariate Tests[b]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.983	3375.133[a]	7.000	404.000	.000	.983
	Wilks' Lambda	.017	3375.133[a]	7.000	404.000	.000	.983
	Hotelling's Trace	58.480	3375.133[a]	7.000	404.000	.000	.983
	Roy's Largest Root	58.480	3375.133[a]	7.000	404.000	.000	.983
EI	Pillai's Trace	.044	2.688[a]	7.000	404.000	.010	.044
	Wilks' Lambda	.956	2.688[a]	7.000	404.000	.010	.044
	Hotelling's Trace	.047	2.688[a]	7.000	404.000	.010	.044
	Roy's Largest Root	.047	2.688[a]	7.000	404.000	.010	.044
SN	Pillai's Trace	.046	2.777[a]	7.000	404.000	.008	.046
	Wilks' Lambda	.954	2.777[a]	7.000	404.000	.008	.046
	Hotelling's Trace	.048	2.777[a]	7.000	404.000	.008	.046
	Roy's Largest Root	.048	2.777[a]	7.000	404.000	.008	.046
TF	Pillai's Trace	.060	3.716[a]	7.000	404.000	.001	.060
	Wilks' Lambda	.940	3.716[a]	7.000	404.000	.001	.060
	Hotelling's Trace	.064	3.716[a]	7.000	404.000	.001	.060
	Roy's Largest Root	.064	3.716[a]	7.000	404.000	.001	.060
JP	Pillai's Trace	.042	2.508[a]	7.000	404.000	.016	.042
	Wilks' Lambda	.958	2.508[a]	7.000	404.000	.016	.042
	Hotelling's Trace	.043	2.508[a]	7.000	404.000	.016	.042
	Roy's Largest Root	.043	2.508[a]	7.000	404.000	.016	.042
EI * SN	Pillai's Trace	.028	1.683[a]	7.000	404.000	.111	.028
	Wilks' Lambda	.972	1.683[a]	7.000	404.000	.111	.028
	Hotelling's Trace	.029	1.683[a]	7.000	404.000	.111	.028
	Roy's Largest Root	.029	1.683[a]	7.000	404.000	.111	.028
EI * TF	Pillai's Trace	.030	1.779[a]	7.000	404.000	.090	.030
	Wilks' Lambda	.970	1.779[a]	7.000	404.000	.090	.030
	Hotelling's Trace	.031	1.779[a]	7.000	404.000	.090	.030
	Roy's Largest Root	.031	1.779[a]	7.000	404.000	.090	.030
EI * JP	Pillai's Trace	.021	1.221[a]	7.000	404.000	.290	.021
	Wilks' Lambda	.979	1.221[a]	7.000	404.000	.290	.021
	Hotelling's Trace	.021	1.221[a]	7.000	404.000	.290	.021
	Roy's Largest Root	.021	1.221[a]	7.000	404.000	.290	.021
SN * TF	Pillai's Trace	.054	3.277[a]	7.000	404.000	.002	.054
	Wilks' Lambda	.946	3.277[a]	7.000	404.000	.002	.054
	Hotelling's Trace	.057	3.277[a]	7.000	404.000	.002	.054
	Roy's Largest Root	.057	3.277[a]	7.000	404.000	.002	.054

SN * JP	Pillai's Trace	.036	2.185[a]	7.000	404.000	.035	.036
	Wilks' Lambda	.964	2.185[a]	7.000	404.000	.035	.036
	Hotelling's Trace	.038	2.185[a]	7.000	404.000	.035	.036
	Roy's Largest Root	.038	2.185[a]	7.000	404.000	.035	.036
TF * JP	Pillai's Trace	.053	3.251[a]	7.000	404.000	.002	.053
	Wilks' Lambda	.947	3.251[a]	7.000	404.000	.002	.053
	Hotelling's Trace	.056	3.251[a]	7.000	404.000	.002	.053
	Roy's Largest Root	.056	3.251[a]	7.000	404.000	.002	.053
EI * SN * TF	Pillai's Trace	.027	1.581[a]	7.000	404.000	.139	.027
	Wilks' Lambda	.973	1.581[a]	7.000	404.000	.139	.027
	Hotelling's Trace	.027	1.581[a]	7.000	404.000	.139	.027
	Roy's Largest Root	.027	1.581[a]	7.000	404.000	.139	.027
EI * SN * JP	Pillai's Trace	.015	.906[a]	7.000	404.000	.501	.015
	Wilks' Lambda	.985	.906[a]	7.000	404.000	.501	.015
	Hotelling's Trace	.016	.906[a]	7.000	404.000	.501	.015
	Roy's Largest Root	.016	.906[a]	7.000	404.000	.501	.015
EI * TF * JP	Pillai's Trace	.029	1.720[a]	7.000	404.000	.103	.029
	Wilks' Lambda	.971	1.720[a]	7.000	404.000	.103	.029
	Hotelling's Trace	.030	1.720[a]	7.000	404.000	.103	.029
	Roy's Largest Root	.030	1.720[a]	7.000	404.000	.103	.029
SN * TF * JP	Pillai's Trace	.046	2.786[a]	7.000	404.000	.008	.046
	Wilks' Lambda	.954	2.786[a]	7.000	404.000	.008	.046
	Hotelling's Trace	.048	2.786[a]	7.000	404.000	.008	.046
	Roy's Largest Root	.048	2.786[a]	7.000	404.000	.008	.046
EI * SN * TF * JP	Pillai's Trace	.039	2.368[a]	7.000	404.000	.022	.039
	Wilks' Lambda	.961	2.368[a]	7.000	404.000	.022	.039
	Hotelling's Trace	.041	2.368[a]	7.000	404.000	.022	.039
	Roy's Largest Root	.041	2.368[a]	7.000	404.000	.022	.039

a. Exact statistic

b. Design: Intercept + EI + SN + TF + JP + EI * SN + EI * TF + EI * JP + SN * TF + SN * JP + TF * JP + EI * SN * TF + EI * SN * JP + EI * TF * JP + SN * TF * JP + EI * SN * TF * JP

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
IPI Factor 1	1.098	15	410	.356
IPI Factor 2	.799	15	410	.679
IPI Factor 3	1.582	15	410	.075
IPI Factor 4	1.095	15	410	.358
IPI Factor 5	.670	15	410	.814
IPI Factor 6	.863	15	410	.607
IPI Factor 7	.649	15	410	.833

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + EI + SN + TF + JP + EI * SN + EI * TF + EI * JP + SN * TF + SN * JP + TF * JP + EI * SN * TF + EI * SN * JP + EI * TF * JP + SN * TF * JP + EI * SN * TF * JP

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	IPI Factor 1	315.742[a]	15	21.049	2.651	.001	.088
	IPI Factor 2	1781.767[b]	15	118.784	3.195	.000	.105
	IPI Factor 3	371.450[c]	15	24.763	2.242	.005	.076
	IPI Factor 4	485.230[d]	15	32.349	2.357	.003	.079
	IPI Factor 5	300.754[e]	15	20.050	1.617	.066	.056
	IPI Factor 6	748.554[f]	15	49.904	3.705	.000	.119
	IPI Factor 7	437.299[g]	15	29.153	3.247	.000	.106
Intercept	IPI Factor 1	71641.117	1	71641.117	9021.037	.000	.957
	IPI Factor 2	332146.145	1	332146.145	8934.368	.000	.956
	IPI Factor 3	70000.922	1	70000.922	6338.692	.000	.939
	IPI Factor 4	126491.328	1	126491.328	9218.074	.000	.957
	IPI Factor 5	117909.774	1	117909.774	9510.080	.000	.959
	IPI Factor 6	34388.529	1	34388.529	2553.159	.000	.862
	IPI Factor 7	40793.214	1	40793.214	4543.411	.000	.917
EI	IPI Factor 1	53.612	1	53.612	6.751	.010	.016
	IPI Factor 2	363.151	1	363.151	9.768	.002	.023
	IPI Factor 3	170.212	1	170.212	15.413	.000	.036
	IPI Factor 4	62.103	1	62.103	4.526	.034	.011
	IPI Factor 5	66.112	1	66.112	5.332	.021	.013
	IPI Factor 6	130.701	1	130.701	9.704	.002	.023
	IPI Factor 7	2.545	1	2.545	.283	.595	.001

SN	IPI Factor 1	26.454	1	26.454	3.331	.069	.008
	IPI Factor 2	190.913	1	190.913	5.135	.024	.012
	IPI Factor 3	3.185	1	3.185	.288	.592	.001
	IPI Factor 4	59.668	1	59.668	4.348	.038	.010
	IPI Factor 5	1.458	1	1.458	.118	.732	.000
	IPI Factor 6	69.412	1	69.412	5.153	.024	.012
	IPI Factor 7	51.082	1	51.082	5.689	.018	.014
TF	IPI Factor 1	11.575	1	11.575	1.458	.228	.004
	IPI Factor 2	133.214	1	133.214	3.583	.059	.009
	IPI Factor 3	4.505	1	4.505	.408	.523	.001
	IPI Factor 4	4.590	1	4.590	.334	.563	.001
	IPI Factor 5	116.186	1	116.186	9.371	.002	.022
	IPI Factor 6	37.526	1	37.526	2.786	.096	.007
	IPI Factor 7	28.000	1	28.000	3.119	.078	.008
JP	IPI Factor 1	.014	1	.014	.002	.966	.000
	IPI Factor 2	33.712	1	33.712	.907	.342	.002
	IPI Factor 3	.809	1	.809	.073	.787	.000
	IPI Factor 4	.820	1	.820	.060	.807	.000
	IPI Factor 5	6.143	1	6.143	.496	.482	.001
	IPI Factor 6	60.056	1	60.056	4.459	.035	.011
	IPI Factor 7	67.794	1	67.794	7.551	.006	.018
EI * SN	IPI Factor 1	.243	1	.243	.031	.861	.000
	IPI Factor 2	82.989	1	82.989	2.232	.136	.005
	IPI Factor 3	45.736	1	45.736	4.141	.042	.010
	IPI Factor 4	.179	1	.179	.013	.909	.000
	IPI Factor 5	10.791	1	10.791	.870	.351	.002
	IPI Factor 6	.535	1	.535	.040	.842	.000
	IPI Factor 7	1.964	1	1.964	.219	.640	.001
EI * TF	IPI Factor 1	1.629	1	1.629	.205	.651	.001
	IPI Factor 2	.244	1	.244	.007	.936	.000
	IPI Factor 3	7.934	1	7.934	.718	.397	.002
	IPI Factor 4	50.374	1	50.374	3.671	.056	.009
	IPI Factor 5	7.589	1	7.589	.612	.434	.001
	IPI Factor 6	.371	1	.371	.028	.868	.000
	IPI Factor 7	2.210	1	2.210	.246	.620	.001
EI * JP	IPI Factor 1	3.074	1	3.074	.387	.534	.001
	IPI Factor 2	2.073	1	2.073	.056	.813	.000
	IPI Factor 3	4.173	1	4.173	.378	.539	.001
	IPI Factor 4	2.479	1	2.479	.181	.671	.000

	IPI Factor 5	16.240	1	16.240	1.310	.253	.003
	IPI Factor 6	21.683	1	21.683	1.610	.205	.004
	IPI Factor 7	9.349	1	9.349	1.041	.308	.003
SN * TF	IPI Factor 1	.692	1	.692	.087	.768	.000
	IPI Factor 2	64.170	1	64.170	1.726	.190	.004
	IPI Factor 3	.218	1	.218	.020	.888	.000
	IPI Factor 4	4.306	1	4.306	.314	.576	.001
	IPI Factor 5	43.750	1	43.750	3.529	.061	.009
	IPI Factor 6	140.710	1	140.710	10.447	.001	.025
	IPI Factor 7	25.854	1	25.854	2.880	.090	.007
SN * JP	IPI Factor 1	.863	1	.863	.109	.742	.000
	IPI Factor 2	14.934	1	14.934	.402	.527	.001
	IPI Factor 3	.016	1	.016	.001	.969	.000
	IPI Factor 4	15.639	1	15.639	1.140	.286	.003
	IPI Factor 5	.076	1	.076	.006	.938	.000
	IPI Factor 6	123.609	1	123.609	9.177	.003	.022
	IPI Factor 7	9.522	1	9.522	1.061	.304	.003
TF * JP	IPI Factor 1	11.756	1	11.756	1.480	.224	.004
	IPI Factor 2	28.502	1	28.502	.767	.382	.002
	IPI Factor 3	20.795	1	20.795	1.883	.171	.005
	IPI Factor 4	11.079	1	11.079	.807	.369	.002
	IPI Factor 5	35.946	1	35.946	2.899	.089	.007
	IPI Factor 6	83.449	1	83.449	6.196	.013	.015
	IPI Factor 7	11.284	1	11.284	1.257	.263	.003
EI * SN * TF	IPI Factor 1	.342	1	.342	.043	.836	.000
	IPI Factor 2	2.510	1	2.510	.068	.795	.000
	IPI Factor 3	10.527	1	10.527	.953	.329	.002
	IPI Factor 4	.007	1	.007	.001	.982	.000
	IPI Factor 5	15.242	1	15.242	1.229	.268	.003
	IPI Factor 6	38.920	1	38.920	2.890	.090	.007
	IPI Factor 7	10.923	1	10.923	1.217	.271	.003
EI * SN * JP	IPI Factor 1	3.436	1	3.436	.433	.511	.001
	IPI Factor 2	14.604	1	14.604	.393	.531	.001
	IPI Factor 3	.032	1	.032	.003	.957	.000
	IPI Factor 4	.001	1	.001	.000	.995	.000
	IPI Factor 5	.067	1	.067	.005	.942	.000
	IPI Factor 6	34.199	1	34.199	2.539	.112	.006
	IPI Factor 7	1.154	1	1.154	.129	.720	.000
EI * TF * JP	IPI Factor 1	9.929	1	9.929	1.250	.264	.003

	IPI Factor 2	10.711	1	10.711	.288	.592	.001
	IPI Factor 3	3.073	1	3.073	.278	.598	.001
	IPI Factor 4	21.523	1	21.523	1.568	.211	.004
	IPI Factor 5	1.415	1	1.415	.114	.736	.000
	IPI Factor 6	32.902	1	32.902	2.443	.119	.006
	IPI Factor 7	24.744	1	24.744	2.756	.098	.007
SN * TF * JP	IPI Factor 1	.005	1	.005	.001	.981	.000
	IPI Factor 2	2.191	1	2.191	.059	.808	.000
	IPI Factor 3	1.016	1	1.016	.092	.762	.000
	IPI Factor 4	2.940	1	2.940	.214	.644	.001
	IPI Factor 5	49.811	1	49.811	4.018	.046	.010
	IPI Factor 6	119.021	1	119.021	8.837	.003	.021
	IPI Factor 7	21.732	1	21.732	2.420	.121	.006
EI * SN * TF * JP	IPI Factor 1	26.743	1	26.743	3.367	.067	.008
	IPI Factor 2	16.933	1	16.933	.455	.500	.001
	IPI Factor 3	.599	1	.599	.054	.816	.000
	IPI Factor 4	7.765	1	7.765	.566	.452	.001
	IPI Factor 5	6.406	1	6.406	.517	.473	.001
	IPI Factor 6	52.132	1	52.132	3.871	.050	.009
	IPI Factor 7	45.009	1	45.009	5.013	.026	.012
Error	IPI Factor 1	3256.040	410	7.942			
	IPI Factor 2	15242.255	410	37.176			
	IPI Factor 3	4527.808	410	11.043			
	IPI Factor 4	5626.061	410	13.722			
	IPI Factor 5	5083.344	410	12.398			
	IPI Factor 6	5522.296	410	13.469			
	IPI Factor 7	3681.203	410	8.979			
Total	IPI Factor 1	168436.677	426				
	IPI Factor 2	784190.688	426				
	IPI Factor 3	164038.510	426				
	IPI Factor 4	299491.813	426				
	IPI Factor 5	270890.118	426				
	IPI Factor 6	89228.162	426				
	IPI Factor 7	96866.219	426				
Corrected Total	IPI Factor 1	3571.782	425				
	IPI Factor 2	17024.023	425				
	IPI Factor 3	4899.257	425				
	IPI Factor 4	6111.291	425				

	IPI Factor 5	5384.098	425				
	IPI Factor 6	6270.850	425				
	IPI Factor 7	4118.502	425				

a. R Squared = .088 (Adjusted R Squared = .055)

b. R Squared = .105 (Adjusted R Squared = .072)

c. R Squared = .076 (Adjusted R Squared = .042)

d. R Squared = .079 (Adjusted R Squared = .046)

e. R Squared = .056 (Adjusted R Squared = .021)

f. R Squared = .119 (Adjusted R Squared = .087)

g. R Squared = .106 (Adjusted R Squared = .073)

1. EI Preference

Dependent Variable	EI Preference	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPI Factor 1	Extravert	20.206	.345	19.529	20.884
	Introvert	19.130	.230	18.679	19.582
IPI Factor 2	Extravert	43.750	.746	42.284	45.216
	Introvert	40.949	.497	39.973	41.926
IPI Factor 3	Extravert	20.400	.406	19.601	21.200
	Introvert	18.483	.271	17.951	19.015
IPI Factor 4	Extravert	26.714	.453	25.823	27.604
	Introvert	25.555	.302	24.962	26.149
IPI Factor 5	Extravert	25.830	.431	24.983	26.677
	Introvert	24.635	.287	24.071	25.199
IPI Factor 6	Extravert	14.467	.449	13.584	15.349
	Introvert	12.787	.299	12.199	13.374
IPI Factor 7	Extravert	14.724	.367	14.004	15.445
	Introvert	14.959	.244	14.479	15.439

2. SN Preference

Dependent Variable	SN Preference	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPI Factor 1	Sensation	19.290	.375	18.553	20.027
	iNtuition	20.046	.176	19.700	20.392
IPI Factor 2	Sensation	41.334	.811	39.739	42.929
	iNtuition	43.365	.381	42.617	44.113
IPI Factor 3	Sensation	19.311	.442	18.441	20.180
	iNtuition	19.573	.207	19.165	19.981
IPI Factor 4	Sensation	25.567	.493	24.598	26.536
	iNtuition	26.702	.231	26.248	27.157
IPI Factor 5	Sensation	25.144	.469	24.223	26.065
	iNtuition	25.321	.220	24.889	25.753
IPI Factor 6	Sensation	13.015	.488	12.055	13.974
	iNtuition	14.239	.229	13.789	14.689
IPI Factor 7	Sensation	14.316	.399	13.533	15.100
	iNtuition	15.367	.187	14.999	15.734

3. TF Preference

Dependent Variable	TF Preference	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPI Factor 1	Thinking	19.418	.206	19.013	19.824
	Feeling	19.918	.359	19.212	20.624
IPI Factor 2	Thinking	41.501	.446	40.624	42.378
	Feeling	43.198	.777	41.670	44.725
IPI Factor 3	Thinking	19.286	.243	18.808	19.764
	Feeling	19.598	.424	18.765	20.430
IPI Factor 4	Thinking	25.977	.271	25.444	26.510
	Feeling	26.292	.472	25.364	27.220
IPI Factor 5	Thinking	24.440	.258	23.934	24.947
	Feeling	26.025	.449	25.142	26.907
IPI Factor 6	Thinking	14.077	.269	13.549	14.605
	Feeling	13.177	.468	12.257	14.096
IPI Factor 7	Thinking	14.453	.219	14.022	14.884
	Feeling	15.230	.382	14.480	15.981

4. JP Preference

Dependent Variable	JP Preference	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPI Factor 1	Judging	19.659	.221	19.224	20.095
	Perceiving	19.677	.350	18.989	20.365
IPI Factor 2	Judging	42.776	.479	41.835	43.718
	Perceiving	41.923	.757	40.434	43.412
IPI Factor 3	Judging	19.376	.261	18.863	19.889
	Perceiving	19.508	.413	18.696	20.319
IPI Factor 4	Judging	26.201	.291	25.629	26.773
	Perceiving	26.068	.460	25.163	26.973
IPI Factor 5	Judging	25.050	.277	24.507	25.594
	Perceiving	25.415	.437	24.555	26.274
IPI Factor 6	Judging	14.196	.288	13.630	14.763
	Perceiving	13.057	.456	12.161	13.953
IPI Factor 7	Judging	14.236	.235	13.774	14.699
	Perceiving	15.447	.372	14.715	16.178

Appendix R

Primary Research Question - Canonical Correlation

(MBTI Scales – Seven IPI Factors)

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The default error term in MANOVA has been changed from WITHIN CELLS to
WITHIN+RESIDUAL.  Note that these are the same for all full factorial
designs.

* * * * * * * * * * A n a l y s i s   o f   V a r i a n c e * * * * * * * * *

       426 cases accepted.
         0 cases rejected because of out-of-range factor values.
         0 cases rejected because of missing data.
         1 non-empty cell.

         1 design will be processed.

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

* * * * * * A n a l y s i s   o f   V a r i a n c e -- Design   1 * * * * * *

 EFFECT .. WITHIN CELLS Regression
 Multivariate Tests of Significance (S = 4, M = 1, N = 206 1/2)

Test Name     Value      Approx. F     Hypoth. DF    Error DF      Sig. of F

 Pillais      .30351     4.90293          28.00       1672.00          .000

 Hotellings   .35503     5.24307          28.00       1654.00          .000

 Wilks        .72064     5.08800          28.00       1497.73          .000

 Roys         .19098

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Eigenvalues and Canonical Correlations

 Root No.   Eigenvalue        Pct.      Cum. Pct.     Canon Cor.      Sq. Cor

    1           .23606      66.49093    66.49093       .43701         .19098

    2           .06915      19.47846    85.96939       .25433         .06468

    3           .04511      12.70633    98.67572       .20776         .04316

    4           .00470       1.32428   100.00000       .06841         .00468

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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Dimension Reduction Analysis

Roots	Wilks L.	F	Hypoth. DF	Error DF	Sig. of F
1 TO 4	.72064	5.08800	28.00	1497.73	.000
2 TO 4	.89076	2.73011	18.00	1177.11	.000
3 TO 4	.95236	2.06060	10.00	834.00	.025
4 TO 4	.99532	.49132	4.00	418.00	.742

- -

EFFECT .. WITHIN CELLS Regression (Cont.)
Univariate F-tests with (4,421) D. F.

Variable	Sq. Mul. R	Adj. R-sq.	Hypoth. MS	Error MS	F	Sig. of F
F1	.08058	.07185	71.95691	7.80037	9.22481	.000
F2	.11461	.10620	487.77813	35.80264	13.62408	.000
F3	.08483	.07613	103.90054	10.65001	9.75591	.000
F4	.06060	.05168	92.58681	13.63645	6.78966	.000
F5	.05397	.04498	72.63993	12.09866	6.00396	.000
F6	.10339	.09487	162.08030	13.35518	12.13614	.000
F7	.07857	.06981	80.89312	9.01408	8.97408	.000

- -

Correlations between DEPENDENT and canonical variables
Function No.

Variable	1	2	3
F1	.61657	-.33009	-.02988
F2	.71011	-.33926	.49919
F3	.61529	-.40756	-.11012
F4	.54655	-.22998	.05211
F5	.52446	-.14192	-.05095
F6	.64058	-.59068	-.21164
F7	.42505	.79621	-.25352

- -

Variance in dependent variables explained by canonical variables

CAN. VAR.	Pct Var DEP	Cum Pct DEP	Pct Var COV	Cum Pct COV
1	34.68249	34.68249	6.62368	6.62368
2	20.65785	55.34034	1.33619	7.95987
3	5.37976	60.72010	.23221	8.19208

- -

Correlations between COVARIATES and canonical variables
CAN. VAR.

Covariate	1	2	3
dPREF1	-.63815	.64773	.40789
dPREF2	.77384	.55396	-.10628
dPREF3	.62460	.05719	.64975
dPREF4	.40470	.49690	-.46015

- -

Variance in covariates explained by canonical variables

CAN. VAR.	Pct Var DEP	Cum Pct DEP	Pct Var COV	Cum Pct COV
1	7.44810	7.44810	38.99928	38.99928
2	1.57919	9.02730	24.41482	63.41411
3	.87578	9.90308	20.28951	83.70361

- -

Regression analysis for WITHIN CELLS error term
--- Individual Univariate .9500 confidence intervals

Dependent variable .. F1 IPI Factor 1

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t	Lower -95% CL-	Upper
dPREF1	-.5749439934	-.2048458345	.13408	-4.28814	.000	-.83849	-.31140
dPREF2	.4397445268	.1436576459	.16645	2.64187	.009	.11256	.76692
dPREF3	.3083889777	.0911450762	.16865	1.82861	.068	-.02311	.63988
dPREF4	-.2035410834	-.0725693504	.14955	-1.36103	.174	-.49750	.09042

Dependent variable .. F2 IPI Factor 2

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t	Lower -95% CL-	Upper
dPREF1	-1.1143170598	-.1818535406	.28725	-3.87929	.000	-1.67893	-.54970
dPREF2	.9622280642	.1439851515	.35661	2.69830	.007	.26128	1.66318
dPREF3	1.5610659107	.2113328408	.36131	4.32059	.000	.85087	2.27126
dPREF4	-.7435710842	-.1214325267	.32040	-2.32079	.021	-1.37334	-.11380

Dependent variable .. F3 IPI Factor 3

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t	Lower -95%	CL- Upper
dPREF1	-.7461144152	-.2269783271	.15667	-4.76246	.000	-1.05406	-.43817
dPREF2	.4979785258	.1389044893	.19449	2.56038	.011	.11568	.88028
dPREF3	.3009612614	.0759490468	.19706	1.52727	.127	-.08638	.68830
dPREF4	-.2507018886	-.0763196066	.17474	-1.43468	.152	-.59418	.09278

Dependent variable .. F4 IPI Factor 4

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t	Lower -95%	CL- Upper
dPREF1	-.5954496195	-.1621894608	.17728	-3.35889	.001	-.94391	-.24699
dPREF2	.4607967103	.1150836651	.22008	2.09377	.037	.02820	.89339
dPREF3	.4616312095	.1043050990	.22298	2.07026	.039	.02333	.89993
dPREF4	-.1709445010	-.0465942473	.19773	-.86452	.388	-.55961	.21772

Dependent variable .. F5 IPI Factor 5

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t	Lower -95%	CL- Upper
dPREF1	-.5118215768	-.1485272720	.16698	-3.06515	.002	-.84004	-.18360
dPREF2	.4621871802	.1229793564	.20730	2.22956	.026	.05471	.86966
dPREF3	.3289566936	.0791879520	.21003	1.56621	.118	-.08389	.74180
dPREF4	-.0869312175	-.0252442768	.18625	-.46674	.641	-.45303	.27917

Dependent variable .. F6 IPI Factor 6

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t	Lower -95% CL-	Upper
dPREF1	-1.0324872406	-.2776294701	.17544	-5.88520	.000	-1.37733	-.68764
dPREF2	.2959693995	.0729716874	.21780	1.35891	.175	-.13214	.72408
dPREF3	.4274890680	.0953539423	.22067	1.93722	.053	-.00627	.86124
dPREF4	-.1217218565	-.0327528425	.19568	-.62204	.534	-.50636	.26292

Dependent variable .. F7 IPI Factor 7

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t	Lower -95% CL-	Upper
dPREF1	.1324709613	.0439536691	.14413	.91910	.359	-.15084	.41578
dPREF2	.6709166451	.2041125555	.17893	3.74953	.000	.31920	1.02263
dPREF3	.0389980816	.0107337249	.18129	.21511	.830	-.31735	.39535
dPREF4	.3657556181	.1214409092	.16076	2.27511	.023	.04976	.68176

- -

* * * * * * A n a l y s i s o f V a r i a n c e -- Design 1 * * * * * *

EFFECT .. CONSTANT
Multivariate Tests of Significance (S = 1, M = 2 1/2, N = 206 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.98809	4919.19389	7.00	415.00	.000
Hotellings	82.97435	4919.19389	7.00	415.00	.000
Wilks	.01191	4919.19389	7.00	415.00	.000
Roys	.98809				

Note.. F statistics are exact.

- -

Eigenvalues and Canonical Correlations

Root No.	Eigenvalue	Pct.	Cum. Pct.	Canon Cor.
1	82.97435	100.00000	100.00000	.99403

- -

EFFECT .. CONSTANT (Cont.)
Univariate F-tests with (1,421) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
F1	100969.65508	3283.95451	100969.65508	7.80037	12944.21854	.000
F2	475479.07158	15072.91031	475479.07158	35.80264	13280.55996	.000
F3	97477.33914	4483.65501	97477.33914	10.65001	9152.79158	.000
F4	180392.79167	5740.94343	180392.79167	13.63645	13228.72560	.000
F5	162768.12254	5093.53791	162768.12254	12.09866	13453.39542	.000
F6	52434.23073	5622.52882	52434.23073	13.35518	3926.13570	.000
F7	56121.38441	3794.92934	56121.38441	9.01408	6225.96648	.000

- -

EFFECT .. CONSTANT (Cont.)
Correlations between DEPENDENT and canonical variables
Canonical Variable

Variable	1
F1	.60873
F2	.61659
F3	.51187
F4	.61538
F5	.62059
F6	.33525
F7	.42217

- -

Appendix S

Oneway ANOVAs (IPI Total - Discipline, Campus, Teaching Status)

Oneway ANOVA: Instructional Disciplines – IPI Total Score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
No Response	4	152.6500	40.63771	20.31885	87.9863	217.3137	93.00	180.60
Business & Industry	30	158.5120	18.89009	3.44884	151.4583	165.5657	106.00	192.48
Communication & Fine Arts	40	164.7260	17.54903	2.77475	159.1135	170.3385	103.00	195.00
Education	44	170.3293	18.13037	2.73326	164.8172	175.8415	141.24	212.52
Engineering	25	152.0056	16.96947	3.39389	145.0009	159.0103	117.77	188.95
Humanities	35	164.0840	14.44388	2.44146	159.1224	169.0456	112.00	190.00
Mathematics & Computer Science	17	152.7647	13.76830	3.33930	145.6857	159.8437	133.00	189.00
Medical Sciences	70	163.1713	16.04491	1.91773	159.3455	166.9971	117.00	207.00
Natural Sciences	49	154.8429	17.65651	2.52236	149.7713	159.9144	120.00	196.00
Social Sciences	71	159.5851	18.74186	2.22425	155.1489	164.0212	112.00	199.77
Multiple Disciplines	41	166.0427	16.77914	2.62046	160.7465	171.3388	135.00	202.00
Total	426	161.3548	18.06777	.87539	159.6342	163.0754	93.00	212.52

Test of Homogeneity of Variances

Total IPI Score

Levene Statistic	df1	df2	Sig.
1.902	10	415	.043

ANOVA

Total IPI Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11676.530	10	1167.653	3.814	.000
Within Groups	127062.280	415	306.174		
Total	138738.811	425			

Robust Tests of Equality of Means

Total IPI Score

	Statistic[a]	df1	df2	Sig.
Welch	3.679	10	69.481	.001
Brown-Forsythe	2.764	10	19.583	.026

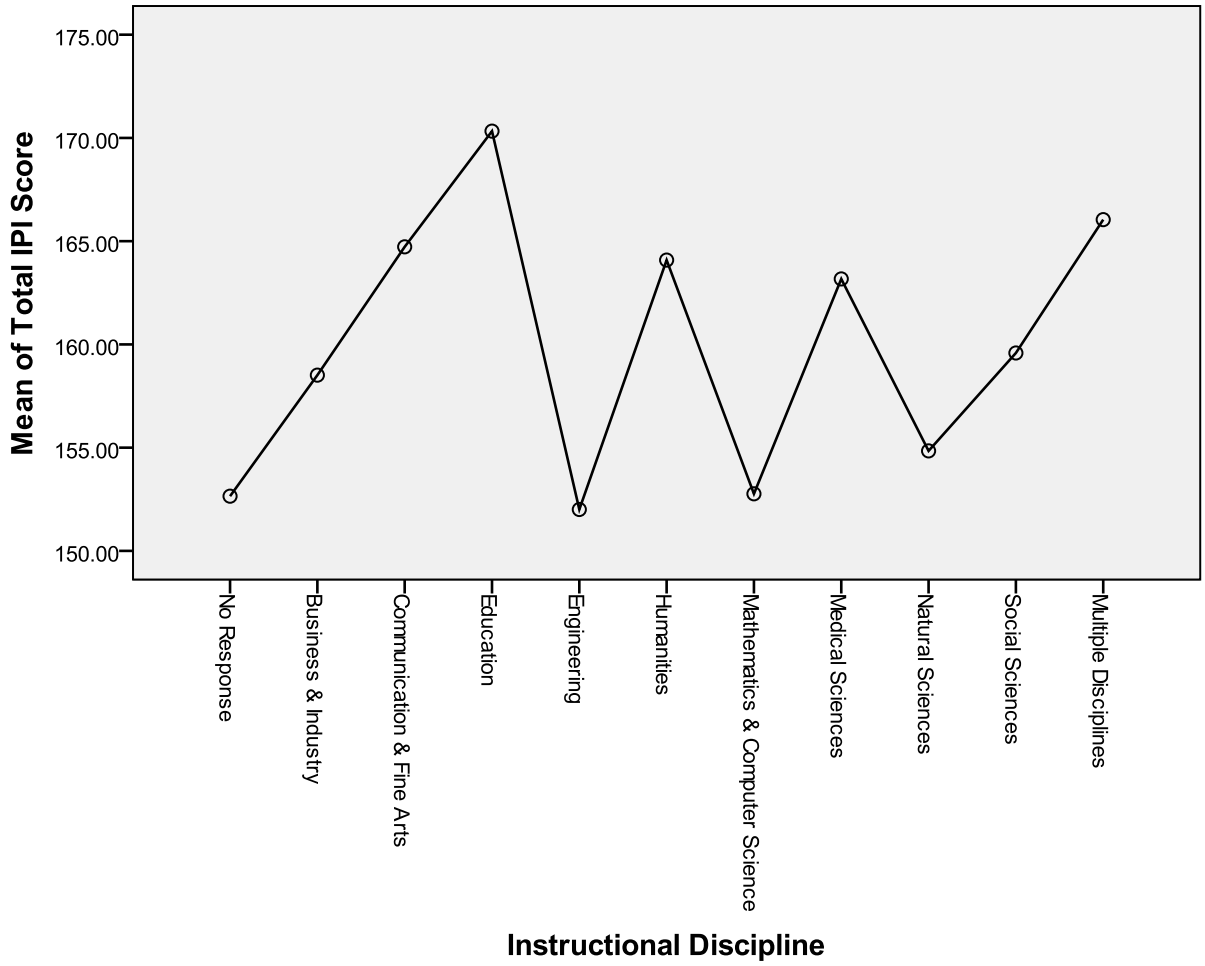
a. Asymptotically F distributed.

Total IPI Score

	Instructional Discipline	N	Subset for alpha = 0.05	
			1	2
Tukey HSD[a,b]	Engineering	25	152.0056	
	No Response	4	152.6500	
	Mathematics & Computer Science	17	152.7647	152.7647
	Natural Sciences	49	154.8429	154.8429
	Business & Industry	30	158.5120	158.5120
	Social Sciences	71	159.5851	159.5851
	Medical Sciences	70	163.1713	163.1713
	Humanities	35	164.0840	164.0840
	Communication & Fine Arts	40	164.7260	164.7260
	Multiple Disciplines	41	166.0427	166.0427
	Education	44		170.3293
	Sig.		.262	.051

Means for groups in homogeneous subsets are displayed.
a. Uses Harmonic Mean Sample Size = 20.691.
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Means Plots



Oneway ANOVA: Campus – IPI Total Score

Total IPI Score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
MST	53	155.3474	17.50882	2.40502	150.5213	160.1734	112.00	195.00
UMC	190	160.8544	16.19872	1.17518	158.5362	163.1725	112.00	199.77
UMKC	120	161.4566	18.65709	1.70315	158.0842	164.8290	103.00	207.00
UMSL	63	167.7241	20.97031	2.64201	162.4428	173.0054	93.00	212.52
Total	426	161.3548	18.06777	.87539	159.6342	163.0754	93.00	212.52

Test of Homogeneity of Variances

Total IPI Score

Levene Statistic	df1	df2	Sig.
1.055	3	422	.368

ANOVA

Total IPI Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4517.366	3	1505.789	4.734	.003
Within Groups	134221.445	422	318.060		
Total	138738.811	425			

Robust Tests of Equality of Means

Total IPI Score

	Statistic[a]	df1	df2	Sig.
Welch	3.993	3	148.635	.009
Brown-Forsythe	4.350	3	251.562	.005

a. Asymptotically F distributed.

Total IPI Score

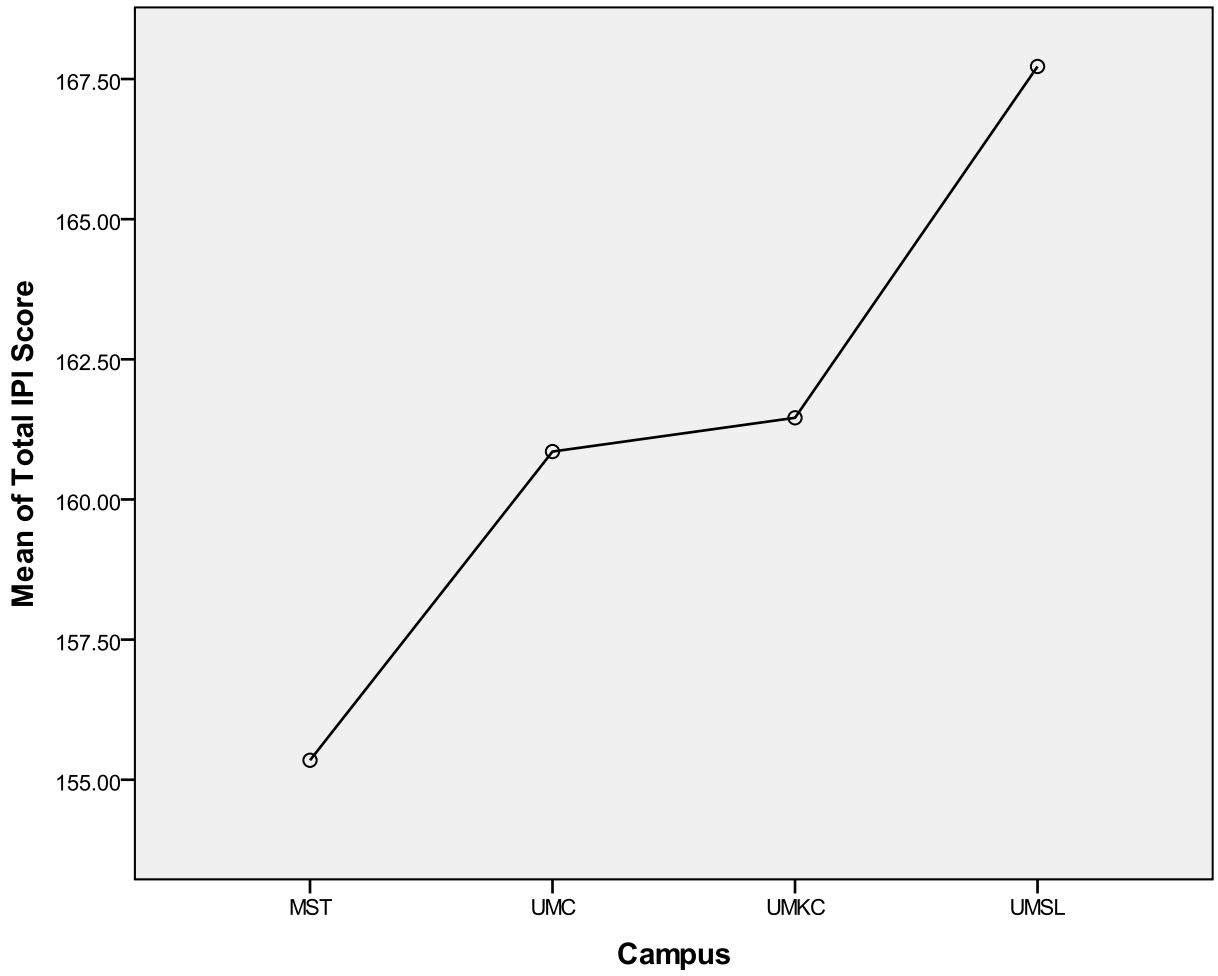
Tukey HSD[a,b]

Campus	N	Subset for alpha = 0.05	
		1	2
MST	53	155.3474	
UMC	190	160.8544	160.8544
UMKC	120	161.4566	161.4566
UMSL	63		167.7241
Sig.		.124	.065

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 82.752.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.



Oneway ANOVA: Teaching Status – IPI Total Score

Descriptives

Total IPI Score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
No Response	4	127.2500	34.21866	17.10933	72.8005	181.6995	93.00	161.00
Tenured	103	159.5580	15.93726	1.57035	156.4432	162.6727	117.77	191.00
Non-Tenured	137	162.3481	18.57156	1.58668	159.2104	165.4858	106.00	212.52
Adjunct Instructor	71	168.3100	18.21142	2.16130	163.9994	172.6206	123.00	205.00
Graduate Teaching Assistant	111	158.5764	16.45489	1.56183	155.4812	161.6716	112.00	194.00
Total	426	161.3548	18.06777	.87539	159.6342	163.0754	93.00	212.52

Test of Homogeneity of Variances

Total IPI Score

Levene Statistic	df1	df2	Sig.
2.958	4	421	.020

ANOVA

Total IPI Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9411.748	4	2352.937	7.660	.000
Within Groups	129327.063	421	307.190		
Total	138738.811	425			

Robust Tests of Equality of Means

Total IPI Score

	Statistic[a]	df1	df2	Sig.
Welch	4.405	4	22.499	.009
Brown-Forsythe	4.562	4	9.444	.026

a. Asymptotically F distributed.

Total IPI Score

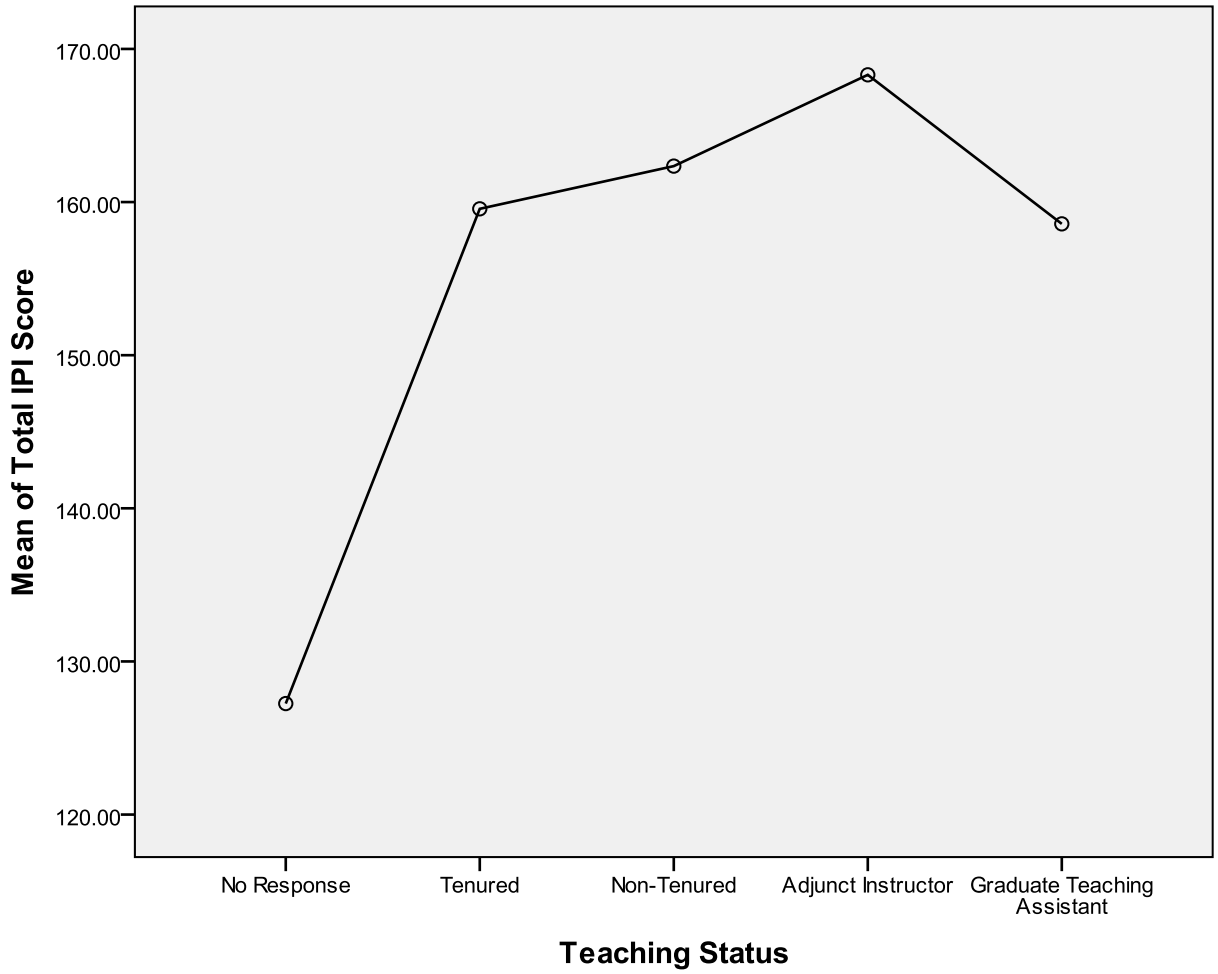
Tukey HSD[a,b]

Teaching Status	N	Subset for alpha = 0.05	
		1	2
No Response	4	127.2500	
Graduate Teaching Assistant	111		158.5764
Tenured	103		159.5580
Non-Tenured	137		162.3481
Adjunct Instructor	71		168.3100
Sig.		1.000	.479

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 17.235.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.



Appendix T

Factorial MANOVA (IPIf1-IPIf7 - Gender, Campus, Teaching Status, Discipline)

Box's Test of Equality of Covariance Matrices[a]

Box's M	124.366
F	1.049
df1	84
df2	4059.684
Sig.	.361

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
IPIf1	1.659	184	241	.000
IPIf2	2.087	184	241	.000
IPIf3	1.684	184	241	.000
IPIf4	1.390	184	241	.008
IPIf5	1.753	184	241	.000
IPIf6	1.306	184	241	.026
IPIf7	1.813	184	241	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + G + C + TS + ID + G * C + G * TS + G * ID + C * TS + C * ID + TS * ID + G * C * TS + G * C * ID + G * TS * ID + C * TS * ID + G * C * TS * ID

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.979	1578.870[a]	7.000	235.000	.000	.979
	Wilks' Lambda	.021	1578.870[a]	7.000	235.000	.000	.979
	Hotelling's Trace	47.030	1578.870[a]	7.000	235.000	.000	.979
	Roy's Largest Root	47.030	1578.870[a]	7.000	235.000	.000	.979
G	Pillai's Trace	.046	1.603[a]	7.000	235.000	.135	.046
	Wilks' Lambda	.954	1.603[a]	7.000	235.000	.135	.046
	Hotelling's Trace	.048	1.603[a]	7.000	235.000	.135	.046
	Roy's Largest Root	.048	1.603[a]	7.000	235.000	.135	.046
C	Pillai's Trace	.080	.924	21.000	711.000	.559	.027
	Wilks' Lambda	.922	.922	21.000	675.343	.562	.027
	Hotelling's Trace	.083	.919	21.000	701.000	.566	.027
	Roy's Largest Root	.049	1.648[b]	7.000	237.000	.123	.046
TS	Pillai's Trace	.182	1.623	28.000	952.000	.022	.046
	Wilks' Lambda	.828	1.634	28.000	848.727	.021	.046
	Hotelling's Trace	.197	1.640	28.000	934.000	.020	.047
	Roy's Largest Root	.100	3.394[b]	7.000	238.000	.002	.091
ID	Pillai's Trace	.362	1.313	70.000	1687.000	.045	.052
	Wilks' Lambda	.684	1.325	70.000	1377.090	.040	.053
	Hotelling's Trace	.400	1.333	70.000	1633.000	.036	.054
	Roy's Largest Root	.172	4.149[b]	10.000	241.000	.000	.147
G * C	Pillai's Trace	.081	.944	21.000	711.000	.533	.027
	Wilks' Lambda	.920	.943	21.000	675.343	.534	.027
	Hotelling's Trace	.085	.942	21.000	701.000	.535	.027
	Roy's Largest Root	.052	1.748[b]	7.000	237.000	.099	.049
G * TS	Pillai's Trace	.138	1.637	21.000	711.000	.036	.046
	Wilks' Lambda	.867	1.635	21.000	675.343	.037	.046
	Hotelling's Trace	.147	1.631	21.000	701.000	.037	.047
	Roy's Largest Root	.072	2.454[b]	7.000	237.000	.019	.068
G * ID	Pillai's Trace	.243	.963	63.000	1687.000	.560	.035
	Wilks' Lambda	.778	.961	63.000	1329.640	.565	.035
	Hotelling's Trace	.259	.958	63.000	1633.000	.570	.036
	Roy's Largest Root	.097	2.594[b]	9.000	241.000	.007	.088
C * TS	Pillai's Trace	.235	.930	63.000	1687.000	.633	.034
	Wilks' Lambda	.785	.925	63.000	1329.640	.643	.034
	Hotelling's Trace	.249	.921	63.000	1633.000	.652	.034
	Roy's Largest Root	.084	2.250[b]	9.000	241.000	.020	.078

C * ID	Pillai's Trace	.775	1.154	182.000	1687.000	.088	.111
	Wilks' Lambda	.434	1.155	182.000	1605.582	.087	.112
	Hotelling's Trace	.902	1.156	182.000	1633.000	.086	.114
	Roy's Largest Root	.253	2.342[b]	26.000	241.000	.000	.202
TS * ID	Pillai's Trace	.815	1.177	189.000	1687.000	.059	.116
	Wilks' Lambda	.416	1.173	189.000	1609.268	.063	.118
	Hotelling's Trace	.947	1.168	189.000	1633.000	.068	.119
	Roy's Largest Root	.242	2.157[b]	27.000	241.000	.001	.195
G * C * TS	Pillai's Trace	.254	1.515	42.000	1440.000	.019	.042
	Wilks' Lambda	.766	1.537	42.000	1105.700	.016	.043
	Hotelling's Trace	.279	1.552	42.000	1400.000	.014	.044
	Roy's Largest Root	.137	4.688[b]	7.000	240.000	.000	.120
G * C * ID	Pillai's Trace	.515	1.197	112.000	1687.000	.084	.074
	Wilks' Lambda	.577	1.211	112.000	1528.997	.072	.075
	Hotelling's Trace	.588	1.224	112.000	1633.000	.061	.077
	Roy's Largest Root	.250	3.773[b]	16.000	241.000	.000	.200
G * TS * ID	Pillai's Trace	.490	1.067	119.000	1687.000	.299	.070
	Wilks' Lambda	.597	1.067	119.000	1542.219	.299	.071
	Hotelling's Trace	.544	1.067	119.000	1633.000	.300	.072
	Roy's Largest Root	.161	2.283[b]	17.000	241.000	.003	.139
C * TS * ID	Pillai's Trace	.868	1.101	217.000	1687.000	.163	.124
	Wilks' Lambda	.387	1.110	217.000	1620.802	.145	.127
	Hotelling's Trace	1.040	1.118	217.000	1633.000	.129	.129
	Roy's Largest Root	.296	2.302[b]	31.000	241.000	.000	.228
G * C * TS * ID	Pillai's Trace	.220	1.571	35.000	1195.000	.019	.044
	Wilks' Lambda	.793	1.609	35.000	990.985	.015	.045
	Hotelling's Trace	.246	1.642	35.000	1167.000	.011	.047
	Roy's Largest Root	.165	5.638[b]	7.000	239.000	.000	.142

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level.

c. Design: Intercept + G + C + TS + ID + G * C + G * TS + G * ID + C * TS + C * ID + TS * ID + G * C * TS + G * C * ID + G * TS * ID + C * TS * ID + G * C * TS * ID

1. Gender

Dependent Variable	Gender	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPIf1	Male	19.268[a]	.244	18.787	19.749
	Female	20.154[a]	.217	19.726	20.581
IPIf2	Male	40.972[a]	.512	39.963	41.981
	Female	43.434[a]	.455	42.538	44.331
IPIf3	Male	18.875[a]	.286	18.312	19.438
	Female	19.594[a]	.254	19.094	20.095
IPIf4	Male	25.402[a]	.323	24.765	26.039
	Female	26.689[a]	.287	26.123	27.255
IPIf5	Male	24.791[a]	.313	24.174	25.407
	Female	25.106[a]	.278	24.558	25.654
IPIf6	Male	13.268[a]	.316	12.644	13.891
	Female	14.121[a]	.281	13.567	14.675
IPIf7	Male	14.744[a]	.265	14.222	15.267
	Female	14.574[a]	.236	14.110	15.039

a. Based on modified population marginal mean.

2. Campus

Dependent Variable	Campus	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPIf1	MST	19.227[a]	.425	18.390	20.065
	UMC	19.713[a]	.252	19.217	20.210
	UMKC	19.639[a]	.305	19.039	20.239
	UMSL	20.425[a]	.393	19.651	21.199
IPIf2	MST	39.296[a]	.891	37.540	41.051
	UMC	42.586[a]	.529	41.544	43.627
	UMKC	42.778[a]	.638	41.520	44.035
	UMSL	43.605[a]	.824	41.983	45.228
IPIf3	MST	18.878[a]	.497	17.899	19.858
	UMC	19.064[a]	.295	18.483	19.645
	UMKC	19.310[a]	.356	18.608	20.011
	UMSL	19.886[a]	.460	18.981	20.791
IPIf4	MST	24.951[a]	.563	23.843	26.060
	UMC	26.045[a]	.334	25.388	26.702
	UMKC	26.389[a]	.403	25.595	27.183
	UMSL	26.711[a]	.520	25.686	27.735
IPIf5	MST	24.151[a]	.545	23.078	25.223
	UMC	25.212[a]	.323	24.576	25.848
	UMKC	24.516[a]	.390	23.748	25.284
	UMSL	25.909[a]	.503	24.917	26.900
IPIf6	MST	12.467[a]	.550	11.383	13.551
	UMC	13.965[a]	.327	13.322	14.608
	UMKC	13.676[a]	.394	12.899	14.453
	UMSL	14.462[a]	.509	13.460	15.465
IPIf7	MST	14.551[a]	.462	13.641	15.460
	UMC	14.783[a]	.274	14.243	15.322
	UMKC	14.780[a]	.331	14.128	15.432
	UMSL	14.299[a]	.427	13.458	15.139

a. Based on modified population marginal mean.

3. Teaching Status

Dependent Variable	Teaching Status	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPIf1	No Response	15.500[a]	1.340	12.861	18.139
	Tenured	19.643[a]	.317	19.019	20.267
	Non-Tenured	19.942[a]	.312	19.328	20.556
	Adjunct Instructor	20.696[a]	.361	19.984	21.408
	Graduate Teaching Assistant	19.203[a]	.320	18.571	19.834
IPIf2	No Response	31.250[a]	2.809	25.717	36.783
	Tenured	42.025[a]	.664	40.717	43.333
	Non-Tenured	41.826[a]	.653	40.539	43.113
	Adjunct Instructor	44.499[a]	.758	43.007	45.992
	Graduate Teaching Assistant	42.126[a]	.672	40.803	43.450
IPIf3	No Response	13.250[a]	1.567	10.163	16.337
	Tenured	19.420[a]	.370	18.690	20.150
	Non-Tenured	19.693[a]	.364	18.976	20.411
	Adjunct Instructor	20.408[a]	.423	19.576	21.241
	Graduate Teaching Assistant	18.174[a]	.375	17.435	18.912
IPIf4	No Response	17.250[a]	1.773	13.757	20.743
	Tenured	26.191[a]	.419	25.365	27.017
	Non-Tenured	25.638[a]	.412	24.826	26.450
	Adjunct Instructor	27.070[a]	.478	26.127	28.012
	Graduate Teaching Assistant	26.375[a]	.424	25.540	27.210
IPIf5	No Response	24.500[a]	1.716	21.119	27.881
	Tenured	24.756[a]	.406	23.957	25.555
	Non-Tenured	24.938[a]	.399	24.152	25.724
	Adjunct Instructor	25.572[a]	.463	24.660	26.484
	Graduate Teaching Assistant	24.715[a]	.411	23.906	25.523
IPIf6	No Response	10.500[a]	1.735	7.082	13.918
	Tenured	13.035[a]	.410	12.228	13.843
	Non-Tenured	13.304[a]	.403	12.510	14.099
	Adjunct Instructor	15.538[a]	.468	14.616	16.460
	Graduate Teaching Assistant	13.618[a]	.415	12.800	14.435
IPIf7	No Response	15.000[a]	1.456	12.133	17.867
	Tenured	15.022[a]	.344	14.344	15.699
	Non-Tenured	14.424[a]	.338	13.757	15.091
	Adjunct Instructor	14.273[a]	.393	13.500	15.047
	Graduate Teaching Assistant	14.769[a]	.348	14.084	15.455

a. Based on modified population marginal mean.

4. Instructional Discipline

Dependent Variable	Instructional Discipline	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPIf1	No Response	17.000[a]	1.340	14.361	19.639
	Business & Industry	19.841[a]	.524	18.810	20.873
	Communication & Fine Arts	20.470[a]	.513	19.460	21.481
	Education	19.614[a]	.500	18.630	20.598
	Engineering	19.412[a]	.636	18.159	20.666
	Humanities	19.967[a]	.512	18.957	20.976
	Mathematics & Computer Science	19.972[a]	.700	18.593	21.352
	Medical Sciences	19.585[a]	.481	18.638	20.533
	Natural Sciences	19.867[a]	.476	18.929	20.805
	Social Sciences	19.792[a]	.420	18.965	20.619
	Multiple Disciplines	19.524[a]	.480	18.580	20.469
IPIf2	No Response	37.250[a]	2.809	31.717	42.783
	Business & Industry	41.901[a]	1.098	39.739	44.064
	Communication & Fine Arts	44.232[a]	1.076	42.113	46.350
	Education	44.569[a]	1.047	42.506	46.632
	Engineering	41.263[a]	1.334	38.635	43.890
	Humanities	42.441[a]	1.074	40.325	44.557
	Mathematics & Computer Science	40.417[a]	1.468	37.525	43.309
	Medical Sciences	43.566[a]	1.008	41.580	45.553
	Natural Sciences	40.710[a]	.998	38.743	42.677
	Social Sciences	41.515[a]	.880	39.781	43.249
	Multiple Disciplines	42.902[a]	1.006	40.921	44.883
IPIf3	No Response	17.750[a]	1.567	14.663	20.837
	Business & Industry	19.159[a]	.612	17.952	20.365
	Communication & Fine Arts	19.922[a]	.600	18.740	21.104
	Education	19.431[a]	.584	18.280	20.582
	Engineering	18.657[a]	.744	17.191	20.123
	Humanities	19.508[a]	.599	18.327	20.688
	Mathematics & Computer Science	18.000[a]	.819	16.387	19.613
	Medical Sciences	18.989[a]	.563	17.881	20.097
	Natural Sciences	18.762[a]	.557	17.665	19.859
	Social Sciences	19.580[a]	.491	18.613	20.548
	Multiple Disciplines	20.064[a]	.561	18.959	21.169
IPIf4	No Response	21.400[a]	1.773	17.907	24.893
	Business & Industry	25.844[a]	.693	24.479	27.209
	Communication & Fine Arts	27.079[a]	.679	25.741	28.416
	Education	27.175[a]	.661	25.872	28.477
	Engineering	25.710[a]	.842	24.051	27.368

	Humanities	26.819[a]	.678	25.483	28.155
	Mathematics & Computer Science	25.333[a]	.927	23.508	27.159
	Medical Sciences	26.339[a]	.637	25.085	27.593
	Natural Sciences	26.518[a]	.630	25.276	27.759
	Social Sciences	25.192[a]	.556	24.098	26.287
	Multiple Disciplines	25.803[a]	.635	24.552	27.053
IPIf5	No Response	29.000[a]	1.716	25.619	32.381
	Business & Industry	24.944[a]	.671	23.623	26.266
	Communication & Fine Arts	24.747[a]	.657	23.453	26.042
	Education	25.613[a]	.640	24.352	26.873
	Engineering	24.517[a]	.815	22.912	26.122
	Humanities	24.717[a]	.656	23.424	26.010
	Mathematics & Computer Science	25.708[a]	.897	23.941	27.475
	Medical Sciences	24.308[a]	.616	23.095	25.522
	Natural Sciences	24.314[a]	.610	23.112	25.516
	Social Sciences	24.514[a]	.538	23.454	25.573
	Multiple Disciplines	25.394[a]	.614	24.184	26.605
IPIf6	No Response	11.250[a]	1.735	7.832	14.668
	Business & Industry	14.133[a]	.678	12.797	15.468
	Communication & Fine Arts	13.926[a]	.664	12.617	15.235
	Education	15.948[a]	.647	14.674	17.222
	Engineering	12.098[a]	.824	10.475	13.721
	Humanities	14.275[a]	.664	12.968	15.582
	Mathematics & Computer Science	9.958[a]	.907	8.172	11.745
	Medical Sciences	14.256[a]	.623	13.029	15.483
	Natural Sciences	12.569[a]	.617	11.354	13.784
	Social Sciences	14.106[a]	.544	13.035	15.177
	Multiple Disciplines	14.451[a]	.621	13.227	15.675
IPIf7	No Response	19.000[a]	1.456	16.133	21.867
	Business & Industry	14.851[a]	.569	13.731	15.972
	Communication & Fine Arts	13.515[a]	.557	12.417	14.613
	Education	15.128[a]	.543	14.059	16.197
	Engineering	14.351[a]	.691	12.990	15.713
	Humanities	15.191[a]	.557	14.094	16.288
	Mathematics & Computer Science	13.181[a]	.761	11.682	14.679
	Medical Sciences	15.187[a]	.523	14.157	16.216
	Natural Sciences	14.615[a]	.517	13.596	15.634
	Social Sciences	14.548[a]	.456	13.650	15.447
	Multiple Disciplines	14.349[a]	.521	13.322	15.375

a. Based on modified population marginal mean.

Appendix U

Factorial MANOVA per MBTI Temperament (IPIf1-IPIf7 – Exposure & Discipline

NT (iNtuitive-Thinkers) Factorial MANOVA

Box's Test of Equality of Covariance Matrices[a]

Box's M	190.914
F	1.341
df1	84
df2	2101.002
Sig.	.023

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.990	1609.745[a]	7.000	119.000	.000	.990
	Wilks' Lambda	.010	1609.745[a]	7.000	119.000	.000	.990
	Hotelling's Trace	94.691	1609.745[a]	7.000	119.000	.000	.990
	Roy's Largest Root	94.691	1609.745[a]	7.000	119.000	.000	.990
EXP	Pillai's Trace	.348	2.268	21.000	363.000	.001	.116
	Wilks' Lambda	.677	2.373	21.000	342.254	.001	.122
	Hotelling's Trace	.441	2.471	21.000	353.000	.000	.128
	Roy's Largest Root	.331	5.723[b]	7.000	121.000	.000	.249
ID	Pillai's Trace	.790	1.591	70.000	875.000	.002	.113
	Wilks' Lambda	.419	1.610	70.000	700.700	.002	.117
	Hotelling's Trace	.962	1.612	70.000	821.000	.002	.121
	Roy's Largest Root	.342	4.271[b]	10.000	125.000	.000	.255
EXP * ID	Pillai's Trace	1.127	1.000	168.000	875.000	.490	.161
	Wilks' Lambda	.284	.995	168.000	814.293	.507	.165
	Hotelling's Trace	1.416	.989	168.000	821.000	.527	.168
	Roy's Largest Root	.387	2.018[b]	24.000	125.000	.007	.279

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level.

c. Design: Intercept + EXP + ID + EXP * ID

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
IPIf1	4.298	37	125	.000
IPIf2	3.380	37	125	.000
IPIf3	2.812	37	125	.000
IPIf4	2.657	37	125	.000
IPIf5	2.090	37	125	.001
IPIf6	1.241	37	125	.190
IPIf7	1.400	37	125	.088

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + EXP + ID + EXP * ID

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	IPIf1	375.361[a]	37	10.145	1.426	.077	.297
	IPIf2	1857.441[b]	37	50.201	1.464	.063	.302
	IPIf3	671.880[c]	37	18.159	2.012	.002	.373
	IPIf4	716.215[d]	37	19.357	1.528	.044	.311
	IPIf5	446.131[e]	37	12.058	1.078	.369	.242
	IPIf6	932.773[f]	37	25.210	2.549	.000	.430
	IPIf7	393.349[g]	37	10.631	1.198	.230	.262
Intercept	IPIf1	29527.924	1	29527.924	4149.915	.000	.971
	IPIf2	135962.409	1	135962.409	3965.997	.000	.969
	IPIf3	28868.035	1	28868.035	3198.998	.000	.962
	IPIf4	53038.249	1	53038.249	4186.847	.000	.971
	IPIf5	51222.862	1	51222.862	4580.971	.000	.973
	IPIf6	14398.324	1	14398.324	1456.073	.000	.921
	IPIf7	18745.348	1	18745.348	2113.142	.000	.944
EXP	IPIf1	86.452	3	28.817	4.050	.009	.089
	IPIf2	356.127	3	118.709	3.463	.018	.077
	IPIf3	270.090	3	90.030	9.977	.000	.193
	IPIf4	174.167	3	58.056	4.583	.004	.099
	IPIf5	54.830	3	18.277	1.635	.185	.038
	IPIf6	242.132	3	80.711	8.162	.000	.164
	IPIf7	13.658	3	4.553	.513	.674	.012

ID	IPIf1	151.442	10	15.144	2.128	.027	.145
	IPIf2	371.627	10	37.163	1.084	.379	.080
	IPIf3	129.707	10	12.971	1.437	.171	.103
	IPIf4	246.392	10	24.639	1.945	.045	.135
	IPIf5	96.227	10	9.623	.861	.572	.064
	IPIf6	234.305	10	23.431	2.369	.013	.159
	IPIf7	106.853	10	10.685	1.205	.294	.088
EXP * ID	IPIf1	148.422	24	6.184	.869	.642	.143
	IPIf2	901.319	24	37.555	1.095	.359	.174
	IPIf3	172.228	24	7.176	.795	.737	.132
	IPIf4	291.104	24	12.129	.957	.526	.155
	IPIf5	299.490	24	12.479	1.116	.336	.176
	IPIf6	276.230	24	11.510	1.164	.288	.183
	IPIf7	252.503	24	10.521	1.186	.267	.185
Error	IPIf1	889.414	125	7.115			
	IPIf2	4285.253	125	34.282			
	IPIf3	1128.011	125	9.024			
	IPIf4	1583.478	125	12.668			
	IPIf5	1397.708	125	11.182			
	IPIf6	1236.058	125	9.888			
	IPIf7	1108.855	125	8.871			
Total	IPIf1	64229.862	163				
	IPIf2	293053.430	163				
	IPIf3	63001.157	163				
	IPIf4	114722.956	163				
	IPIf5	103035.488	163				
	IPIf6	32892.315	163				
	IPIf7	39571.714	163				
Corrected Total	IPIf1	1264.775	162				
	IPIf2	6142.694	162				
	IPIf3	1799.891	162				
	IPIf4	2299.693	162				
	IPIf5	1843.838	162				
	IPIf6	2168.831	162				
	IPIf7	1502.204	162				

a. R Squared = .297 (Adjusted R Squared = .089)
b. R Squared = .302 (Adjusted R Squared = .096)
c. R Squared = .373 (Adjusted R Squared = .188)
d. R Squared = .311 (Adjusted R Squared = .108)
e. R Squared = .242 (Adjusted R Squared = .018)
f. R Squared = .430 (Adjusted R Squared = .261)
g. R Squared = .262 (Adjusted R Squared = .043)

NT (iNtuitive-Thinkers) Factorial MANOVA – Estimated Marginal Means

Exposure to Instructional Strategies

Dependent Variable	Exposure to Instructional Strategies	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPIf1	High Exposure	20.461[a]	.533	19.405	21.516
	Moderate Exposure	19.975	.417	19.150	20.800
	Mild Exposure	18.156	.430	17.305	19.007
	No Exposure	18.768[a]	.794	17.197	20.339
IPIf2	High Exposure	43.958[a]	1.171	41.641	46.276
	Moderate Exposure	42.730	.915	40.919	44.540
	Mild Exposure	39.332	.944	37.464	41.200
	No Exposure	39.806[a]	1.742	36.358	43.254
IPIf3	High Exposure	21.689[a]	.601	20.500	22.878
	Moderate Exposure	19.922	.469	18.993	20.851
	Mild Exposure	17.972	.484	17.014	18.930
	No Exposure	16.646[a]	.894	14.877	18.415
IPIf4	High Exposure	27.861[a]	.712	26.453	29.270
	Moderate Exposure	26.606	.556	25.505	27.707
	Mild Exposure	24.554	.574	23.419	25.689
	No Exposure	24.750[a]	1.059	22.654	26.846
IPIf5	High Exposure	25.752[a]	.669	24.429	27.076
	Moderate Exposure	24.636	.523	23.601	25.670
	Mild Exposure	25.772	.539	24.706	26.839
	No Exposure	24.325[a]	.995	22.356	26.294
IPIf6	High Exposure	15.367[a]	.629	14.122	16.611
	Moderate Exposure	14.937	.491	13.965	15.910
	Mild Exposure	12.002	.507	10.999	13.005
	No Exposure	11.833[a]	.936	9.981	13.685
IPIf7	High Exposure	15.679[a]	.596	14.500	16.858
	Moderate Exposure	15.504	.465	14.583	16.425
	Mild Exposure	15.191	.480	14.241	16.141
	No Exposure	14.354[a]	.886	12.600	16.108

a. Based on modified population marginal mean.

NF (iNtuitive-Feelers) Factorial MANOVA

Box's Test of Equality of Covariance Matrices[a]

Box's M	116.831
F	1.403
df1	56
df2	2881.593
Sig.	.026

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.986	796.844[a]	7.000	77.000	.000	.986
	Wilks' Lambda	.014	796.844[a]	7.000	77.000	.000	.986
	Hotelling's Trace	72.440	796.844[a]	7.000	77.000	.000	.986
	Roy's Largest Root	72.440	796.844[a]	7.000	77.000	.000	.986
EXP	Pillai's Trace	.543	1.796	28.000	320.000	.009	.136
	Wilks' Lambda	.529	1.928	28.000	279.050	.004	.147
	Hotelling's Trace	.763	2.056	28.000	302.000	.002	.160
	Roy's Largest Root	.563	6.430[b]	7.000	80.000	.000	.360
ID	Pillai's Trace	.985	1.359	70.000	581.000	.034	.141
	Wilks' Lambda	.317	1.420	70.000	455.800	.020	.151
	Hotelling's Trace	1.368	1.472	70.000	527.000	.011	.164
	Roy's Largest Root	.668	5.548[b]	10.000	83.000	.000	.401
EXP * ID	Pillai's Trace	1.713	1.345	140.000	581.000	.010	.245
	Wilks' Lambda	.130	1.343	140.000	522.265	.011	.253
	Hotelling's Trace	2.481	1.334	140.000	527.000	.013	.262
	Roy's Largest Root	.709	2.941[b]	20.000	83.000	.000	.415

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level.

c. Design: Intercept + EXP + ID + EXP * ID

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
IPIf1	2.257	34	83	.001
IPIf2	2.249	34	83	.001
IPIf3	1.388	34	83	.116
IPIf4	1.852	34	83	.012
IPIf5	1.428	34	83	.097
IPIf6	1.214	34	83	.236
IPIf7	1.382	34	83	.118

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + EXP + ID + EXP * ID

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	IPIf1	322.667[a]	34	9.490	1.905	.009	.438
	IPIf2	2020.646[b]	34	59.431	2.786	.000	.533
	IPIf3	517.439[c]	34	15.219	2.003	.006	.451
	IPIf4	808.929[d]	34	23.792	2.599	.000	.516
	IPIf5	507.997[e]	34	14.941	1.108	.346	.312
	IPIf6	969.359[f]	34	28.511	2.718	.000	.527
	IPIf7	383.156[g]	34	11.269	1.456	.085	.374
Intercept	IPIf1	14456.277	1	14456.277	2902.002	.000	.972
	IPIf2	65291.835	1	65291.835	3061.193	.000	.974
	IPIf3	13247.323	1	13247.323	1743.673	.000	.955
	IPIf4	24515.319	1	24515.319	2678.415	.000	.970
	IPIf5	23041.694	1	23041.694	1708.376	.000	.954
	IPIf6	6476.109	1	6476.109	617.314	.000	.881
	IPIf7	8458.914	1	8458.914	1092.897	.000	.929
EXP	IPIf1	51.439	4	12.860	2.582	.043	.111
	IPIf2	476.960	4	119.240	5.591	.000	.212
	IPIf3	103.236	4	25.809	3.397	.013	.141
	IPIf4	140.698	4	35.175	3.843	.006	.156
	IPIf5	108.038	4	27.010	2.003	.102	.088
	IPIf6	322.199	4	80.550	7.678	.000	.270
	IPIf7	73.426	4	18.356	2.372	.059	.103

ID	IPIf1	69.951	10	6.995	1.404	.193	.145
	IPIf2	750.832	10	75.083	3.520	.001	.298
	IPIf3	121.416	10	12.142	1.598	.121	.161
	IPIf4	310.081	10	31.008	3.388	.001	.290
	IPIf5	79.734	10	7.973	.591	.817	.066
	IPIf6	286.139	10	28.614	2.728	.006	.247
	IPIf7	78.906	10	7.891	1.019	.434	.109
EXP * ID	IPIf1	152.560	20	7.628	1.531	.093	.270
	IPIf2	514.898	20	25.745	1.207	.270	.225
	IPIf3	180.671	20	9.034	1.189	.285	.223
	IPIf4	241.292	20	12.065	1.318	.191	.241
	IPIf5	315.675	20	15.784	1.170	.301	.220
	IPIf6	252.428	20	12.621	1.203	.273	.225
	IPIf7	200.056	20	10.003	1.292	.208	.237
Error	IPIf1	413.463	83	4.981			
	IPIf2	1770.298	83	21.329			
	IPIf3	630.581	83	7.597			
	IPIf4	759.692	83	9.153			
	IPIf5	1119.461	83	13.487			
	IPIf6	870.735	83	10.491			
	IPIf7	642.412	83	7.740			
Total	IPIf1	49596.073	118				
	IPIf2	240642.272	118				
	IPIf3	47579.573	118				
	IPIf4	87764.589	118				
	IPIf5	79426.047	118				
	IPIf6	27478.556	118				
	IPIf7	28973.500	118				
Corrected Total	IPIf1	736.130	117				
	IPIf2	3790.944	117				
	IPIf3	1148.020	117				
	IPIf4	1568.621	117				
	IPIf5	1627.458	117				
	IPIf6	1840.094	117				
	IPIf7	1025.568	117				

a. R Squared = .438 (Adjusted R Squared = .208)
b. R Squared = .533 (Adjusted R Squared = .342)
c. R Squared = .451 (Adjusted R Squared = .226)
d. R Squared = .516 (Adjusted R Squared = .317)
e. R Squared = .312 (Adjusted R Squared = .030)
f. R Squared = .527 (Adjusted R Squared = .333)
g. R Squared = .374 (Adjusted R Squared = .117)

NF (iNtuitive-Feelers) Factorial MANOVA – Estimated Marginal Means

Exposure to Instructional Strategies

Dependent Variable	Exposure to Instructional Strategies	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPIf1	No Response	21.130[a]	1.578	17.991	24.269
	High Exposure	21.394[a]	.537	20.326	22.461
	Moderate Exposure	20.682[a]	.534	19.620	21.744
	Mild Exposure	19.692[a]	.444	18.808	20.575
	No Exposure	18.167[a]	.804	16.568	19.765
IPIf2	No Response	44.000[a]	3.266	37.505	50.495
	High Exposure	47.832[a]	1.110	45.623	50.040
	Moderate Exposure	43.984[a]	1.105	41.786	46.182
	Mild Exposure	41.948[a]	.919	40.120	43.775
	No Exposure	37.558[a]	1.663	34.251	40.865
IPIf3	No Response	20.500[a]	1.949	16.623	24.377
	High Exposure	22.065[a]	.663	20.746	23.383
	Moderate Exposure	19.544[a]	.660	18.232	20.856
	Mild Exposure	18.758[a]	.549	17.667	19.849
	No Exposure	16.333[a]	.992	14.360	18.307
IPIf4	No Response	28.000[a]	2.139	23.745	32.255
	High Exposure	28.876[a]	.727	27.429	30.323
	Moderate Exposure	25.672[a]	.724	24.232	27.112
	Mild Exposure	26.674[a]	.602	25.476	27.871
	No Exposure	22.451[a]	1.089	20.285	24.618
IPIf5	No Response	22.000[a]	2.597	16.835	27.165
	High Exposure	27.542[a]	.883	25.785	29.298
	Moderate Exposure	26.027[a]	.879	24.279	27.775
	Mild Exposure	24.754[a]	.731	23.300	26.207
	No Exposure	25.627[a]	1.322	22.997	28.257
IPIf6	No Response	13.500[a]	2.290	8.945	18.055
	High Exposure	17.317[a]	.779	15.768	18.866
	Moderate Exposure	14.814[a]	.775	13.273	16.356
	Mild Exposure	13.824[a]	.645	12.542	15.106
	No Exposure	9.833[a]	1.166	7.514	12.153
IPIf7	No Response	11.500[a]	1.967	7.587	15.413
	High Exposure	17.052[a]	.669	15.722	18.383
	Moderate Exposure	15.598[a]	.666	14.274	16.922
	Mild Exposure	15.811[a]	.554	14.710	16.912
	No Exposure	14.944[a]	1.002	12.952	16.937

a. Based on modified population marginal mean.

SJ (Sensation-Judgers) Factorial MANOVA

Box's Test of Equality of Covariance Matrices[a]

Box's M	147.999
F	1.548
df1	56
df2	1793.958
Sig.	.006

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.984	631.790[a]	7.000	74.000	.000	.984
	Wilks' Lambda	.016	631.790[a]	7.000	74.000	.000	.984
	Hotelling's Trace	59.764	631.790[a]	7.000	74.000	.000	.984
	Roy's Largest Root	59.764	631.790[a]	7.000	74.000	.000	.984
EXP	Pillai's Trace	.537	1.706	28.000	308.000	.016	.134
	Wilks' Lambda	.542	1.772	28.000	268.233	.012	.142
	Hotelling's Trace	.705	1.826	28.000	290.000	.008	.150
	Roy's Largest Root	.453	4.980[b]	7.000	77.000	.000	.312
ID	Pillai's Trace	.721	1.021	63.000	560.000	.437	.103
	Wilks' Lambda	.446	1.034	63.000	422.880	.412	.109
	Hotelling's Trace	.910	1.044	63.000	506.000	.390	.115
	Roy's Largest Root	.406	3.607[b]	9.000	80.000	.001	.289
EXP * ID	Pillai's Trace	1.151	.829	133.000	560.000	.907	.164
	Wilks' Lambda	.267	.831	133.000	499.490	.901	.172
	Hotelling's Trace	1.542	.838	133.000	506.000	.891	.180
	Roy's Largest Root	.643	2.709[b]	19.000	80.000	.001	.392

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level.

c. Design: Intercept + EXP + ID + EXP * ID

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
IPIf1	1.707	32	80	.029
IPIf2	1.335	32	80	.151
IPIf3	1.621	32	80	.043
IPIf4	1.512	32	80	.071
IPIf5	1.534	32	80	.064
IPIf6	1.416	32	80	.107
IPIf7	1.361	32	80	.136

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + EXP + ID + EXP * ID

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	IPIf1	434.838[a]	32	13.589	1.564	.056	.385
	IPIf2	1536.959[b]	32	48.030	1.170	.282	.319
	IPIf3	669.697[c]	32	20.928	2.105	.004	.457
	IPIf4	597.484[d]	32	18.671	1.466	.087	.370
	IPIf5	518.280[e]	32	16.196	1.533	.064	.380
	IPIf6	688.132[f]	32	21.504	1.793	.019	.418
	IPIf7	212.406[g]	32	6.638	.722	.848	.224
Intercept	IPIf1	13827.261	1	13827.261	1591.338	.000	.952
	IPIf2	65035.544	1	65035.544	1584.284	.000	.952
	IPIf3	12772.957	1	12772.957	1284.878	.000	.941
	IPIf4	24678.517	1	24678.517	1937.014	.000	.960
	IPIf5	22944.610	1	22944.610	2171.973	.000	.964
	IPIf6	6522.242	1	6522.242	543.710	.000	.872
	IPIf7	6268.970	1	6268.970	682.095	.000	.895
EXP	IPIf1	176.636	4	44.159	5.082	.001	.203
	IPIf2	415.723	4	103.931	2.532	.047	.112
	IPIf3	281.518	4	70.379	7.080	.000	.261
	IPIf4	169.379	4	42.345	3.324	.014	.143
	IPIf5	138.857	4	34.714	3.286	.015	.141
	IPIf6	122.697	4	30.674	2.557	.045	.113
	IPIf7	16.338	4	4.084	.444	.776	.022

ID	IPIf1	129.558	9	14.395	1.657	.114	.157
	IPIf2	544.078	9	60.453	1.473	.172	.142
	IPIf3	166.710	9	18.523	1.863	.070	.173
	IPIf4	258.414	9	28.713	2.254	.027	.202
	IPIf5	172.403	9	19.156	1.813	.078	.169
	IPIf6	248.100	9	27.567	2.298	.024	.205
	IPIf7	114.827	9	12.759	1.388	.207	.135
EXP * ID	IPIf1	127.107	19	6.690	.770	.734	.155
	IPIf2	380.129	19	20.007	.487	.961	.104
	IPIf3	117.990	19	6.210	.625	.877	.129
	IPIf4	180.441	19	9.497	.745	.761	.150
	IPIf5	97.617	19	5.138	.486	.961	.104
	IPIf6	180.045	19	9.476	.790	.712	.158
	IPIf7	79.580	19	4.188	.456	.972	.098
Error	IPIf1	695.126	80	8.689			
	IPIf2	3284.034	80	41.050			
	IPIf3	795.279	80	9.941			
	IPIf4	1019.240	80	12.740			
	IPIf5	845.116	80	10.564			
	IPIf6	959.665	80	11.996			
	IPIf7	735.260	80	9.191			
Total	IPIf1	43080.948	113				
	IPIf2	199762.400	113				
	IPIf3	41908.368	113				
	IPIf4	76952.770	113				
	IPIf5	69728.273	113				
	IPIf6	23129.171	113				
	IPIf7	21238.214	113				
Corrected Total	IPIf1	1129.964	112				
	IPIf2	4820.993	112				
	IPIf3	1464.976	112				
	IPIf4	1616.723	112				
	IPIf5	1363.396	112				
	IPIf6	1647.797	112				
	IPIf7	947.666	112				

a. R Squared = .385 (Adjusted R Squared = .139)
b. R Squared = .319 (Adjusted R Squared = .046)
c. R Squared = .457 (Adjusted R Squared = .240)
d. R Squared = .370 (Adjusted R Squared = .117)
e. R Squared = .380 (Adjusted R Squared = .132)
f. R Squared = .418 (Adjusted R Squared = .185)
g. R Squared = .224 (Adjusted R Squared = -.086)

SJ (Sensation-Judgers) Factorial MANOVA – Estimated Marginal Means

Exposure to Instructional Strategies

Dependent Variable	Exposure to Instructional Strategies	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPIf1	No Response	20.000[a]	2.948	14.134	25.866
	High Exposure	21.357[a]	.893	19.579	23.135
	Moderate Exposure	20.940[a]	.563	19.820	22.060
	Mild Exposure	18.559[a]	.519	17.526	19.592
	No Exposure	17.500[a]	1.031	15.447	19.553
IPIf2	No Response	41.000[a]	6.407	28.250	53.750
	High Exposure	47.357[a]	1.942	43.493	51.221
	Moderate Exposure	43.511[a]	1.224	41.076	45.946
	Mild Exposure	41.056[a]	1.128	38.811	43.301
	No Exposure	39.714[a]	2.242	35.253	44.176
IPIf3	No Response	16.000[a]	3.153	9.725	22.275
	High Exposure	22.643[a]	.955	20.741	24.544
	Moderate Exposure	20.175[a]	.602	18.976	21.373
	Mild Exposure	18.040[a]	.555	16.935	19.145
	No Exposure	16.214[a]	1.103	14.019	18.410
IPIf4	No Response	25.000[a]	3.569	17.897	32.103
	High Exposure	28.929[a]	1.082	26.776	31.081
	Moderate Exposure	27.435[a]	.682	26.078	28.791
	Mild Exposure	25.351[a]	.629	24.101	26.602
	No Exposure	24.143[a]	1.249	21.657	26.628
IPIf5	No Response	30.000[a]	3.250	23.532	36.468
	High Exposure	26.494[a]	.985	24.533	28.454
	Moderate Exposure	25.627[a]	.621	24.392	26.862
	Mild Exposure	24.606[a]	.572	23.467	25.744
	No Exposure	22.526[a]	1.137	20.263	24.790
IPIf6	No Response	8.000[a]	3.463	1.107	14.893
	High Exposure	16.500[a]	1.050	14.411	18.589
	Moderate Exposure	14.799[a]	.661	13.483	16.115
	Mild Exposure	13.588[a]	.610	12.374	14.801
	No Exposure	12.286[a]	1.212	9.874	14.698
IPIf7	No Response	17.000[a]	3.032	10.967	23.033
	High Exposure	12.929[a]	.919	11.100	14.757
	Moderate Exposure	12.851[a]	.579	11.699	14.003
	Mild Exposure	13.089[a]	.534	12.027	14.152
	No Exposure	13.286[a]	1.061	11.175	15.397

a. Based on modified population marginal mean.

SP (Sensation-Perceivers) Factorial MANOVA

Warnings

Box's Test of Equality of Covariance Matrices is not computed because there are fewer than two nonsingular cell covariance matrices.

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.997	425.267[a]	7.000	8.000	.000	.997
	Wilks' Lambda	.003	425.267[a]	7.000	8.000	.000	.997
	Hotelling's Trace	372.109	425.267[a]	7.000	8.000	.000	.997
	Roy's Largest Root	372.109	425.267[a]	7.000	8.000	.000	.997
EXP	Pillai's Trace	1.319	1.122	21.000	30.000	.379	.440
	Wilks' Lambda	.137	1.117	21.000	23.522	.395	.484
	Hotelling's Trace	3.331	1.058	21.000	20.000	.452	.526
	Roy's Largest Root	2.258	3.226[b]	7.000	10.000	.046	.693
ID	Pillai's Trace	2.456	1.081	49.000	98.000	.366	.351
	Wilks' Lambda	.023	1.014	49.000	45.037	.483	.417
	Hotelling's Trace	6.578	.844	49.000	44.000	.719	.484
	Roy's Largest Root	2.894	5.789[b]	7.000	14.000	.003	.743
EXP * ID	Pillai's Trace	2.126	.873	49.000	98.000	.697	.304
	Wilks' Lambda	.043	.789	49.000	45.037	.792	.362
	Hotelling's Trace	5.363	.688	49.000	44.000	.898	.434
	Roy's Largest Root	3.072	6.144[b]	7.000	14.000	.002	.754

a. Exact statistic
b. The statistic is an upper bound on F that yields a lower bound on the significance level.
c. Design: Intercept + EXP + ID + EXP * ID

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
IPIf1	2.304	17	14	.061
IPIf2	2.688	17	14	.034
IPIf3	2.577	17	14	.040
IPIf4	2.356	17	14	.056
IPIf5	1.780	17	14	.141
IPIf6	1.385	17	14	.272
IPIf7	1.985	17	14	.100

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.
a. Design: Intercept + EXP + ID + EXP * ID

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	IPIf1	171.801[a]	17	10.106	.850	.629	.508
	IPIf2	635.242[b]	17	37.367	.969	.531	.541
	IPIf3	221.452[c]	17	13.027	.911	.578	.525
	IPIf4	236.209[d]	17	13.895	.864	.618	.512
	IPIf5	288.133[e]	17	16.949	1.595	.191	.660
	IPIf6	316.809[f]	17	18.636	1.533	.212	.650
	IPIf7	165.613[g]	17	9.742	.778	.692	.486
Intercept	IPIf1	8168.327	1	8168.327	687.170	.000	.980
	IPIf2	33794.857	1	33794.857	876.239	.000	.984
	IPIf3	8041.036	1	8041.036	562.170	.000	.976
	IPIf4	13564.319	1	13564.319	843.377	.000	.984
	IPIf5	12210.616	1	12210.616	1149.234	.000	.988
	IPIf6	3039.341	1	3039.341	249.969	.000	.947
	IPIf7	4393.626	1	4393.626	350.989	.000	.962
EXP	IPIf1	6.586	3	2.195	.185	.905	.038
	IPIf2	2.977	3	.992	.026	.994	.005
	IPIf3	21.128	3	7.043	.492	.693	.095
	IPIf4	1.953	3	.651	.040	.989	.009
	IPIf5	81.039	3	27.013	2.542	.098	.353
	IPIf6	61.009	3	20.336	1.673	.218	.264
	IPIf7	43.104	3	14.368	1.148	.364	.197
ID	IPIf1	69.019	7	9.860	.829	.580	.293
	IPIf2	132.857	7	18.980	.492	.825	.197
	IPIf3	63.621	7	9.089	.635	.720	.241
	IPIf4	57.040	7	8.149	.507	.815	.202
	IPIf5	136.829	7	19.547	1.840	.157	.479
	IPIf6	170.306	7	24.329	2.001	.128	.500
	IPIf7	54.347	7	7.764	.620	.731	.237
EXP * ID	IPIf1	79.062	7	11.295	.950	.501	.322
	IPIf2	430.495	7	61.499	1.595	.216	.444
	IPIf3	81.205	7	11.601	.811	.593	.289
	IPIf4	117.958	7	16.851	1.048	.443	.344
	IPIf5	104.602	7	14.943	1.406	.277	.413
	IPIf6	84.871	7	12.124	.997	.472	.333
	IPIf7	81.984	7	11.712	.936	.510	.319

Error	IPIf1	166.417	14	11.887			
	IPIf2	539.953	14	38.568			
	IPIf3	200.250	14	14.304			
	IPIf4	225.167	14	16.083			
	IPIf5	148.750	14	10.625			
	IPIf6	170.224	14	12.159			
	IPIf7	175.250	14	12.518			
Total	IPIf1	11529.794	32				
	IPIf2	50732.586	32				
	IPIf3	11549.411	32				
	IPIf4	20051.498	32				
	IPIf5	18700.310	32				
	IPIf6	5728.121	32				
	IPIf7	7082.790	32				
Corrected Total	IPIf1	338.218	31				
	IPIf2	1175.195	31				
	IPIf3	421.702	31				
	IPIf4	461.376	31				
	IPIf5	436.883	31				
	IPIf6	487.033	31				
	IPIf7	340.863	31				

a. R Squared = .508 (Adjusted R Squared = -.090)

b. R Squared = .541 (Adjusted R Squared = -.017)

c. R Squared = .525 (Adjusted R Squared = -.051)

d. R Squared = .512 (Adjusted R Squared = -.081)

e. R Squared = .660 (Adjusted R Squared = .246)

f. R Squared = .650 (Adjusted R Squared = .226)

g. R Squared = .486 (Adjusted R Squared = -.138)

SP (Sensation-Perceivers) Factorial MANOVA – Estimated Marginal Means

Exposure to Instructional Strategies

Dependent Variable	Exposure to Instructional Strategies	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
IPIf1	High Exposure	20.600[a]	1.542	17.293	23.907
	Moderate Exposure	18.943[a]	1.451	15.832	22.055
	Mild Exposure	18.667[a]	.938	16.654	20.679
	No Exposure	19.750[a]	1.724	16.053	23.447
IPIf2	High Exposure	38.200[a]	2.777	32.243	44.157
	Moderate Exposure	40.488[a]	2.613	34.882	46.093
	Mild Exposure	40.893[a]	1.690	37.268	44.518
	No Exposure	42.177[a]	3.105	35.517	48.837
IPIf3	High Exposure	20.800[a]	1.691	17.172	24.428
	Moderate Exposure	19.863[a]	1.592	16.449	23.276
	Mild Exposure	18.500[a]	1.029	16.292	20.708
	No Exposure	18.843[a]	1.891	14.788	22.899
IPIf4	High Exposure	25.352[a]	1.794	21.505	29.199
	Moderate Exposure	25.250[a]	1.688	21.630	28.870
	Mild Exposure	25.528[a]	1.091	23.187	27.869
	No Exposure	25.000[a]	2.005	20.699	29.301
IPIf5	High Exposure	20.896[a]	1.458	17.769	24.023
	Moderate Exposure	23.417[a]	1.372	20.475	26.359
	Mild Exposure	24.167[a]	.887	22.264	26.069
	No Exposure	27.083[a]	1.630	23.588	30.579
IPIf6	High Exposure	13.600[a]	1.559	10.255	16.945
	Moderate Exposure	11.667[a]	1.467	8.520	14.814
	Mild Exposure	13.806[a]	.949	11.770	15.841
	No Exposure	11.044[a]	1.743	7.305	14.784
IPIf7	High Exposure	14.296[a]	1.582	10.902	17.690
	Moderate Exposure	16.333[a]	1.489	13.140	19.527
	Mild Exposure	14.361[a]	.963	12.296	16.426
	No Exposure	12.750[a]	1.769	8.956	16.544

a. Based on modified population marginal mean.